THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The news of the week gives plentiful indications of the process of readjusting values which is in progress throughout the iron trade. Newspaper interviews from presumably high sources intimating that prices are to be maintained count for little, when the changes are actually in progress. More blast furnaces and steel works have been put upon the idle list—evidences of the heroic effort to bring production down to consumption, though in the case of some furnaces at least they are signs that the maker has followed the market till no profit was left. More furnaces will go out when raw materials on hand have been worked up. Pig iron has declined further in the week; coke is lower; the pool price on steel billets has been cut, and in connection with some forms of finished material on which agreements have existed the only open question is as to the date of announcements of new prices. Foreign business leads in interest. Some good export sales of plates and steel bars have been made, but no authentic statement of tonnage is given out. The material goes largely to Great Britain. Sheet bar business is understood to be under negotiation. The campaign in British markets is not fairly begun, but will be vigorously under way within a few months. It is expected to be of no little assistance in preventing demoralization at home and in keeping mills employed. Rumors of concessions to large domestic buyers of steel bars are current, in conjunction with the reports of heavy bar sales in England, but the former are denied by the large producers. Bar iron has been weaker, 1.30c at mill being reported in the Central West. With the increasing disparity in price, steel bars are in little demand. Speculation as to the course of prices for plates and structural material, as well as steel bars, is rife, in view of the settling of the billet market, but thus far no official action has been taken by any of the associations. In the East concessions on structural material are regarded as possible. Much depends on the action of the billet meeting in New York today. Independent interests have sold steel at $2 a ton below the pool price and the amount of steel marketed at cut prices has given rise to reports of concessions by concerns parties to the agreement. It is understood that the Clairton Steel Co. is not acting with the association. There has been some little interest in the rail market the past week, in view of reports of sales by the Lackawanna and Tennessee interests. The former has sold 12,000 tons to the Atchison road and 10,000 tons to the M., K. & T., but the L. & N. purchase from the Tennessee company is not new, a 35,000-ton contract having been closed in June. The pig iron market has been largely in the hands of Southern furnaces the past week. There has been some revision of the prompt disclaimers with which our predictions of exports three weeks ago were received. Fully 50,000 tons of Alabama pig iron has been sold or is now being figured on for shipment to British ports. One 15,000-ton sale of gray forge was made at $8.50 at furnace for export, a rate of $2 a ton from Birmingham to British port having been secured. Another sale was of 10,000 tons of No. 3 foundry. The lifting of accumulated stocks off the domestic market is expected to strengthen the Southern situation and has already done so to the extent that leading interests are not willing to sell for delivery into next year at prices recently named on prompt business. In the past week No. 2 foundry iron has sold at $9.50 Birmingham and the situation is rapidly resolving itself into a survival of the fittest, for the cost line for Southern furnaces buying ore and coke has been passed. A pipe interest bought a round lot of Southern iron last week, but the general foundry trade is buying in the same contracted way that has prevailed for months. The curtailment of pig iron production by Eastern furnaces, as ascertained at a meeting in Philadelphia Monday, was actually nearly 40 percent in October, as compared with September. For November also it is expected that a reduction of 40 percent from September will be made. Central Western furnaces will probably reduce their November production to 50 percent of that for September. Thirty-one furnaces in Ohio and Western Pennsylvania are now idle. As yet, Northern foundry furnaces have not met the low prices of Southern producers, and are therefore booking little business. A significant development is the coming of the Frick Coke Co. into the market again for the sale of its foundry coke.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Nov. 4.

The meeting of the steel billet, sheet bar and tin bar manufacturers, which is being held in New York today, is the event of greatest importance in the steel trade at present. Upon its action depends to a very large extent the course of the iron and steel market during the next three months. Should a material reduction in prices be made, there is little doubt that much new business will be placed, while if quotations are reaffirmed the present stagnant market will continue for some time to come. Rumors and reports connecting producers of steel affiliated with the steel association with cutting agreed prices are numerous, while independent mills are cutting open-hearth quotations openly, and brokers who have Bessemer steel coming to them on old conversion deals are reported cutting the price of Bessemer billets $2 a ton. Within the past few weeks one large producer of open-hearth steel has withdrawn from the association, but contrary to reports is making every effort to maintain association prices. Should the price of billets be reduced materially, the price of such finished material as steel bars, plates, sheets, tin plate and wire products would be likely to fall. It is also reported that an open market will be declared on steel for a short time, but this is doubtful.

Small independent mills are shading quotations on steel bars from $1 to $1.50 per ton, while it is reported that 1.30c has been done on iron bars at Youngstown. The American Steel & Wire Co. this week announced a reduction of $1 per ton on wire nails and all wire products, to meet the prices of independent manufacturers announced in these columns last week. The cut nail manufacturers last week made a reduction of $5 per ton in both iron and steel cut nails, but inasmuch as both products have been selling below agreed quotations for some time, the cut only amounts to a reduction of from $2 to $3 per ton from prevailing prices. In the sheet trade it is reported that transactions have been made on the basis of 2.50c for No. 28 gauge, black sheets, but it is doubtful if better than 2.55c to 2.60c could be done on a small tonnage. Independent pipe manufacturers are cutting under the quoted discounts of the largest producer about 5 percent.

An event of great importance to the coke trade is the announcement of the H. C. Frick Coke Co. that it will again take orders from the foundry trade. As yet no quotations have been made, but the possibility that with its facilities it can undersell the majority of independent producers in the Connellsville coke region, and still make a profit, is not reassuring as to prices. One year ago the H. C. Frick Coke Co. announced its withdrawal from the general coke

market, the United States Steel Corporation having adopted the policy of producing coke for the consumption of its own plants only. Owing to the blowing out of so many of the corporation furnaces, however, a large amount of surplus coke is being produced, despite the putting out of several thousand ovens and the curtailment of production at ovens in operation. The coke pool recently formed among independent operators in the Connellsville region is already having much trouble in maintaining quotations, as large operators who refused to abide by the agreement are selling furnace coke at $1.80 and foundry at $2.50 to $2.60, which is from 10 to 25 cents less than the pool quotations. This week there are nearly 8,000 ovens idle in the upper and lower Connellsville region, while the production will no doubt show a falling off of nearly 100,000 tons, owing to the operation of others only half time.

During the past week the Carnegie Steel Co. banked two furnaces at Youngstown, O., and three furnaces at New Castle, Pa., were blown out for extensive repairs. This increases the number of idle furnaces in the Pittsburg and Valley districts to 31 and the curtailment of production is now on at the rate of 50 percent, instead of 25 per cent as originally contemplated and decided upon. A meeting of the committee appointed by the blast furnace interests in the Central West will be held in this city on Friday for the purpose of officially increasing the curtailment percentage to either 40 or 50 percent. The meeting was to have been held either yesterday or today, but no quorum could be secured on account of the important billet pool meeting in New York.

This week two Bessemer steel plants were added to the idle list, the Republic Iron & Steel Co. shutting down its steel plant at Youngstown, while the Carnegie Steel Co. shut down its Bessemer plant at New Castle, Pa., for an indefinite period. The tin bars for the large plants of the American Tin Plate Co. will be shipped to New Castle from the Ohio works at Youngstown, which continue in operation despite the banking of the furnaces connected therewith.

Pig Iron.—The curtailment of pig iron production in the Central West is now going on at twice the rate anticipated, as 50 percent of the capacity is either down entirely or restricting the daily output. With 31 stacks idle, and those in operation shortening production, there has been a cut of 50 percent in the productive capacity of the Pittsburg and Valley districts, and from present indications this percentage will be still further increased. A meeting of the committee appointed at the meeting of blast furnace interests of the Central West several weeks ago will be held on Friday for the purpose of increasing officially the percentage of curtailment. Despite the low quotations that are being made by Southern pig iron producers, local consumers are not buying to any extent, transactions being largely limited to carload and 100-ton lots. On No. 2 foundry $9.75 Birmingham is being freely offered, equivalent to $14.10 Pittsburg, while on a fairly good sized tonnage a quotation of $9.50 Birmingham was made. Northern furnaces on the other hand are firm in their demands and are securing from $14.50 to $15 for No. 2, Pittsburg. We note the sale of a small lot of Bessemer iron at $14.75 Valley furnace, equal to $15.60, Pittsburg. We revise quotations as follows:

Bessemer, Valley	$14 75 to 15 00
Bessemer, Pittsburg	15 60 to 15 85
No. 1 Foundry	15 00 to 15 50
No. 2 Foundry	14 25 to 14 75
Gray Forge, Pittsburg	13 50 to 14 00
Chilled Basic, Valley	14 75 to 15 00
Chilled Basic, Pittsburg	15 00 to 15 85

Steel.—The large number of idle steel plants has been further increased this week by the shutting down of the Bessemer plant of the Republic Iron & Steel Co. at Youngstown, and the New Castle plant of the Carnegie Steel Co. Steel production in the Central West is even restricted to a greater extent than pig iron, the number of mills that are idle being greater than at any time in the past three years. While the tonnage that is being offered is small, concessions are being offered by all the independent open-hearth plants, while it is rumored that some of the mills in the steel association are offering concessions from agreed prices to secure business. On open-hearth as low as $25 is being done and it is probable that $24 could be done on a desirable tonnage. It is further reported that $25 has been done on Bessemer billets by brokers. Pool quotations are as follows: Bessemer billets 4x4 inches and slabs up to and including .25 carbon, $27, Pittsburg, Wheeling or Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; .26 to .60 carbon, $1 advance, and .61 to 1.00 carbon, $2 advance; open-hearth billets up to and including .60 carbon, $28, and over .60 carbon, $29; billets smaller than 3⅞-inch and sheet and tin bars are $1 per ton extra; Bessemer rods, $34.50 to $35, and open-hearth are held at $1 advance.

Ferro-Manganese.—We quote both foreign and domestic manganese, 80 percent, at $48 per ton delivered at buyer's mill east of the Mississippi river in carload lots.

Spelter.—Prime Western grades are held at 5.80c to 5.83½c, Pittsburg, in carload lots.

Muck Bar.—There is little demand for muck iron and we quote all pig muck iron at $27, Pittsburg.

Skelp.—Both grooved and sheared iron skelp is held at 1.45c to 1.50c, Pittsburg, while steel skelp is quoted at 1.50c to 1.55c.

Rails and Track Material.—None of the mills in this district have secured large rail contracts during the week, although the Lackawanna Steel Co. and the Tennessee Coal, Iron & Railroad Co. have booked orders aggregating 25,000 tons. Light rails are in little demand and concessions are being made. We revise quotations as follows: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds, in carload lots, $36; less than carload lots, $37; 12 pounds, $30 to $31; 16 and 20 pounds, $28 to $29; 25 to 40 pounds, $27.50 to $28. Track material: Spikes, 2.05c to 2.10c; track bolts, square nuts, 2.50c; hexagon nuts, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

Bars.—Sales of iron bars are reported on the basis of 1.30c, Youngstown, while 1.35c is being done on nearly all small orders for common iron bars. Concessions on steel bars are reported, small outside mills cutting agreed quotations from $1 to $1.50 per ton. Large steel bar interests emphatically deny that pool quotations are being cut, although there are many reports of concessions. We quote as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.70c; over 3 inches, 1.80c; common bar iron, 1.35c to 1.45c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

Plates.—The plate market continues quiet and the amount of new business that is being offered is extremely limited. Agreed quotations are, however, being firmly maintained by concerns in the associations. We quote: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg, flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Structural Material.—The market continues quiet, structural fitters not buying heavily despite the fact that they have closed nice contracts in this district during the past few weeks amounting to about 4,000 tons. We quote: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—Further concessions on both black and galvanized sheets are being made by outside mills and 2.50c is reported on 28 gauge black sheets, while 2.55c is freely offered. We revise quotations as follows on 500-bundle lots and over:

No. 28, 2.55c to 2.60c; No. 27, 2.45c to 2.50c; No. 26, 2.35c to 2.40c; Nos. 22 and 24, 2.25c to 2.30c; Nos. 18 and 20, 2.15c to 2.20c; Nos. 14 and 16, 2.05c to 2.10c; Nos. 10 and 12, 1.95c to 2.20c. Galvanized: No. 16, 2.45c to 2.50c; No. 18-20, 2.70c to 2.75c; No. 22-24, 2.95c to 3.00c; No. 25-26, 3.20c to 3.25c; No. 27, 3.45c to 3.50c; No. 28, 3.70c to 3.75c; No. 29, 4.20c to 4.25c; No. 30, 4.35c to 4.40c.

Wire and Wire Nails.—The largest producer of wire and wire nails this week announced a cut of $1 per ton all along the line to meet the quotations that are being made by independent mills. At a meeting of the cut nail manufacturers, held last week, a reduction on both steel and iron cut nails was made from prevailing pool quotations of $5 per ton. We revise quotations as follows: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $1.95; plain wire, carload lots, $1.85; barb wire, carload lots, $2.25; staples, carload lots, $2.15. Galvanizing 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $1.90, and less than carload lots, $1.95, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2 in carload lots and $2.05 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—Little new business is being placed either in the higher grades of steel or shafting. We make the following quotations: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots. Tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. Tool steel is quoted 7 cents and upwards, according to the grade.

Pipes and Tubes.—Independent producers are now shading the quotations of the largest producer, given below, about 5 percent. The National Tube Co. continues to operate its plants in full and has sufficient business to operate at its utmost capacity until the first of the year. We quote as follows in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe.		Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53
Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				
½ to 8 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¼ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¼ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	63

Old Material.—This week the Pennsylvania Railroad Co. sold the old material of its Panhandle bridge over the Monongahela river at $12 per ton. Heavy melting stock is now selling at about $14 per gross ton and there is little buying even at this price.

Coke.—The invasion of the foundry coke market by the H. C. Frick Coke Co. has caused quite a flurry in the general coke trade. What its policy will be with regard to prices is being watched with interest by every independent producer. The fact that so many of the steel corporation furnaces are out of blast no doubt resulted in the Frick company temporarily invading the foundry coke market, but it is doubtful whether this policy will be continued after there is a general resumption at the corporation's furnaces. Strictly first class Connellsville furnace coke is now selling at $1.80 per ton, which is 10 cents below the pool price established by Uniontown operators, while foundry coke is selling at $2.50 and $2.60, as compared with $2.75 established by the coke pool. This week there are about 8,000 ovens idle in the entire Connellsville region and it is estimated that the total weekly production will fall off 100,000 tons, as compared with the record weekly production. For the week ending Saturday, Oct. 24, there were 6,029 ovens out in the upper Connellsville region and 857 in the lower region. The production of the upper region amounted to 175,419 tons and that of the lower region 50,342 tons, showing a falling off of nearly 80,000 tons as compared with previous high records. In addition there were many ovens in the region that only produced coke four days in the week.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Nov. 4.

In its most prominent features this market is without essential change. The buying of raw and finished material is light, consumers generally continuing the policy of making purchases in lots of sufficient tonnage to last them a few weeks. It is noteworthy that the conditions in the two branches of the trade are opposite, for whereas producers of pig iron are disinclined to accept season contracts at the low prices prevailing, manufacturers of heavy finished iron and steel are unable to dispose of their products owing to the fact that consumers are anticipating a readjustment of prices on a lower basis, and are withholding their specifications except for such material as they absolutely require. That there will be a revision of the pool prices in the near future on billets, plates, structural shapes, steel bars, etc., is confidently expected by sellers and buyers, though parties to the official agreements deny that the present schedules are being shaded, in spite of reports to the contrary. There have been some changes made by local jobbers on structural shapes, plates and steel bars, but these apply only on small lots. Southern pig iron continues in its downward course, sales of No. 2 foundry having been made during the week at $9.50 Birmingham. This is an extreme quotation, and does not represent the general market, the bulk of the week's transactions having been made at prices ranging from $9.75 to $10 Birmingham for No. 2 foundry. Northern irons are in light demand owing to their high prices as compared with Southern brands. In finished material, merchant pipe, boiler tubes, wire products and merchant steel are the most active. Sheets are improving in tone, an increased demand being noted during the week. Inquiries are pending for an aggregate of 6,000 tons of open-hearth billets, though it is doubtful if any orders will be placed at current prices. Specifications for several hundred tons of structural shapes have been received from a local car company, the material going into the construction of 1,100 freight cars ordered some time ago by a Southern railroad. The specifications for 2,000 cars, the contracts for which have been let, are still forthcoming. The demand for iron and steel bars is weak, and prices on the former are on the decline owing to the active competition of local manufacturers. Coke is in moderate demand, consumers buying only for immediate requirements. The scrap market is in a state of demoralization, prices not having been as low as they are today for several years.

Pig Iron.—The week has developed the fact that at least one Southern producer is not unwilling to go as low as $9.50 Birmingham for No. 2 foundry for immediate shipment. This price has been made on several lots for quick delivery by a furnace company at Birmingham that has a considerable tonnage stored in its yards which it was anxious to move, and will be continued in force until these accumulations have been disposed of. It is noteworthy also that while other furnaces in the South are willing to accept orders for relatively prompt shipment at prevailing prices, they will not book contracts for extended deliveries at these quotations. This attitude on the part of producers has restricted the buying in this district in a great measure to amounts ranging from 500 tons to single carloads, the latter predominating. In cases where larger

contracts are involved, the buyer generally agrees to take all the iron within the next six months. Southern irons are generally held today on the basis of $10 Birmingham for No. 2 foundry, though on desirable business or in case of active competition this figure has been shaded to $9.75, as in the case of an order for 1,000 tons placed by a Michigan firm at this price last week. The buying during the week under review has been active and includes a number of larger transactions, notably one from a pipe manufacturer for 7,000 tons of Nos. 3 and 4, the total tonnage sold being greater than for some time past. Northern furnaces are quiet and booking only a small business, being unable to compete with Southern producers at the prices the latter are making. We have revised our quotations and quote as follows:

Lake Superior Charcoal	$17 00 to 18 00
Northern Coke Foundry No. 1	16 00 to 16 50
Northern Coke Foundry No. 2	15 50 to 16 00
Northern Coke Foundry No. 3	15 00 to 15 50
Northern Scotch Foundry No. 1	16 00 to 16 50
Ohio Strong Softeners No. 1	17 30 to 17 80
Ohio Strong Softeners No. 2	16 80 to 17 30
Southern Coke Foundry No. 1	14 10 to 14 35
Southern Coke Foundry No. 2	13 60 to 13 85
Southern Coke Foundry No. 3	13 10 to 13 35
Southern Coke Foundry No. 4	12 60 to 12 85
Southern Gray Forge	12 35 to 12 60
Southern Mottled	12 10 to 12 35
Southern Silveries (4% to 6 % Silicon)	15 35 to 16 35
Jackson Co. Silveries (6% to 10% Silicon)	18 80 to 19 80
Alabama and Georgia Car Wheel	21 85
Malleable Bessemer	15 50 to 16 00
Basic Iron	13 85 to 14 35

Billets.—Local demand for billets is quiet, purchases being limted to car lots for forging purposes. The International Harvester Co.'s inquiry for 6,000 tons of open-hearth steel is still pending, and the probabilities are it will not be placed until lower prices are made. We quote mill shipments, carload lots, Chicago delivery: Bessemer, $26 to $28; open-hearth, for re-rolling, $27 to $29; open-hearth, for forging, $30 to $32.

Bars.—Little of interest has transpired during the week either in iron or steel bars. Demand keeps relatively the same level—being far below the capacity of mills—and prices are practically unchanged. Iron is held nominally at 1.45c Chicago, though on desirable business this could undoubtedly be shaded from 50 cents to $1 a ton. Specifications for steel come in slowly, consumers generally following the plan of sending in orders from week to week or month to month for their current requirements instead of making season contracts. Demand from warehouse stocks is moderately good. We quote mill shipments, carload lots, Chicago delivery: Iron, 1.45c to 1.50c; Bessemer steel, 1.76½c; angles less than 3x3, 1.86½c base; hoops, in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c. Quotations from jobbers' stocks: Iron, 1.70c to 1.80c; steel, 1.90c to 2c; hoops, 2.30c to 2.40c; small angles, channels, tees, 2c rates.

Sheets.—In small lots, there has been good buying during the week of both black and galvanized sheets. All gauges are in demand. Prices are slightly firmer. We quote black sheets, mill shipments, No. 27 gauge, 2.71½c to 2.76½c; No. 28 gauge, 2.81½c to 2.86½c; galvanized, mill shipments, 75 and 10 and 2½ percent discount. Demand from store has been brisk, and on carload lots and less we quote as follows: No. 22 gauge, 2.70c to 2.80c; No. 24, 2.70c to 2.80c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c; No. 28, 2.95c to 3.05c. Galvanized sheets from store, 75 and 5 percent discount.

Plates.—Mill business has fallen off to practically nothing. Warehouses report a fair number of orders, though all are for small lots. We quote mill shipments, Chicago delivery: Tank steel, ¼ inch and heavier, 1.75c; flange steel, 1.85c. On lots from jobbers' stocks, we quote: Tank steel, ¼ inch and heavier, 1.90c to 2c; 3-16, 2c to 2.10c; No. 8, 2.10c to 2.20c; No. 10, 2.20c to 2.30c; flange steel, 2.25c to 2.40c, all f. o. b. warehouse.

Structural Steel.—Several hundred tons in new business have been booked during the week by Eastern mills. Specifications were also received from a local car company for 700 tons of shapes to go into the construction of 1,100 cars for the Mexican Central Railroad, the order for which was placed some months back. Jobbers report a quiet week, and prices have been reduced by one local company. We quote mill shipments, Chicago delivery: Beams and channels, 16 inches and under, 1.75c; 18 inches and over, 1.85c; universal plates, 1.75c; angles, 3x3 and larger, 1.75c; tees, 3x3 and larger, 1.80c; zees, 1.75c. On lots from store, we quote beams, channels and angles, 3 inches and larger, 1.90c rates; 18, 20 and 24 inch, 10 cents extra; tees, 1.95c rates.

Merchant Steel.—Mills report that some new business has been taken during the week from implement and carriage manufacturers, and that specifications are being received in satisfactory volume. Prices are without change, and we quote Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c; flat sizes, concave and convex, 2.25c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.35c to 2.45c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; special, 13c and upwards; less than carload lots, 5 and 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—Business continues active, demand being fairly divided between steel and wrought iron pipe. Prices are firm, and to consumers on mill shipments, we quote carload lots, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ inch inclusive	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	70.35	60.35
7 to 12 inches inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—Demand is steady and prices are unchanged. We quote manufacturers' prices, mill shipments, carload lots, Chicago delivery, as follows:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ in.	40.85	37.35	53.35
1¾ to 2½ in.	53.85	36.35	40.35
2¾ to 5 in.	59.35	49.35	{ Up to 4 inches.
6 to 13 in.	53.85	36.35	{ 48.35

For car lots or less direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ in.	40	35	37.50
1¾ to 2½ in.	50	32.50	35
2 to 5 in.	57.50	42.50	{ Up to 4 inches.
6 to 13 in.	50	32.50	{ 45

Cast Iron Pipe.—Orders while of good volume, are largely for carload lots. There is no change in prices, and we quote carload lots, f. o. b. Chicago, 4-inch pipe, $29; 6-inch and upwards, $28; gas pipe, $1 a ton higher.

Rails and Track Supplies.—Mills continue to receive a plentiful supply of inquiries for standard sections, notably from electric railroad enterprises, though few of them result in orders. A good demand for light rails is in evidence, and track supplies are also moving briskly. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than car lots, $32; second quality rails, $27; 25-pound rails, $31 to $32; 12-pound rails, $34 to $35, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 1.90c to 2c; spikes, first quality, 2c to 2.10c; (out of store, 2.25c to 2.35c rates, carload lots) second quality, 1.80c to 1.90c; track bolts, 3½x¾, with square nuts, 2.75c to 2.85c per 100 pounds; with hexagon nuts, 2.90c to 3c, with usual differentials for other sizes.

Wire and Wire Nails.—Manufacturers report there is no diminution in the demand, and that there is every indication of a heavy call for spring goods. The open weather that has been prevailing all over the country the last two weeks has largely stimulated demand for smooth and barbed fencing, and stocks in country warehouses are reported low. We quote prices to jobbers, Chicago delivery, as follows:

Wire nails, carload lots, $2.15; less than carload lots, $2.20. Cut nails, steel, carload lots, $2.30; less than carload lots, $2.35. Plain wire, $2.05 to $2.10 carloads and $2.15 to $2.20 in small lots; galvanized, carloads, $2.35; smaller lots, $2.40. Painted barbed wire, carloads, $2.45;

less than carloads, $2.50; galvanized, carloads, $2.75; less than carloads, $2.80; staples, carloads, $2.30; smaller lots, $2.35; galvanized, carloads, $2.70; small lots, $2.75. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—Coke continues to be in fair demand, though foundrymen are buying only for requirements a few weeks ahead. We quote standard 72-hour Connellsville, $2.85 to $3 at the ovens; West Virginia grades, $5 to $5.25 Chicago.

Old Material.—All kinds of scrap iron and steel, with the exception of stove plate and light cast, are lifeless, and prices are lower than they have been for several years. Material in abundance is offered to city dealers and consumers, but finds few purchasers. Stove plate is scarce and prices on this material are holding firm at quotations given below. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$15 50 to 16 00
Old steel rails (mixed lengths)	11 50 to 12 00
Old steel rails (long lengths)	14 50 to 15 00
Relaying rails	24 00 to 25 00
Old wheels	15 50 to 16 00
Heavy melting steel	11 50 to 12 00
Mixed country steel	9 50 to 10 00

The following are selling prices for net tons:

No. 1 R. R. wrought	$12 50 to 13 00
No. 2 R. R. wrought	11 50 to 12 00
Shafting	12 50 to 13 00
Dealers' forge No. 1	11 00 to 11 50
No. 1 busheling and wrought pipe	9 50 to 10 00
No. 1 cast	12 00 to 12 50
Heavy cast (300 pounds and over)	9 50 to 10 00
Agricultural malleable	11 00 to 11 50
Iron axles	16 00 to 16 50
Steel axles	13 50 to 14 00
No. 1 boilers, cut	9 50 to 10 00
Cast borings	4 00 to 4 50
Mixed borings, etc.	4 00 to 4 50
Wrought turnings	9 00 to 9 50
Machine shop turnings	9 00 to 9 50
Iron axle turnings	9 50 to 10 00
Steel axle turnings	9 00 to 9 50
Stove plate and light cast scrap	10 00 to 10 50
Old iron splice bars	14 00 to 14 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Nov. 4.

Reports of shipments of ore for October are not yet complete, but indications are that the total will be several hundred thousand tons below that of October, 1902. The Pittsburg Steamship Co. is gradually taking its propellers out of commission and other shippers will soon do likewise. The formation of sand bars at the entrance of the Conneaut, O., harbor has prevented vessels drawing 18 feet from entering and while an effort will be made to clear the obstruction by dredging, it is doubtful if any more large vessels will enter the harbor this year.

Pig Iron.—Southern iron is down to a basis of $9.50 Birmingham for No. 2, or $13.35 Cleveland, and it is possible that even that figure could be shaded on a large tonnage. Sales for export and the fact that English agents are negotiating for Southern iron in large quantities have caused a firmer feeling in the South and it is not expected that further concessions will be made, at least, not in the near future. Considerable iron has been sold by the Southern agents, including a few contracts for delivery the first three months and the first half of 1904, but furnaces are not anxious to make long time contracts. Northern furnaces are still reluctant to meet the Southern prices and some agents declare they are paying no attention to Birmingham quotations. The fact is apparent, however, that the Southern iron is becoming a more important factor in the market in this district and cannot be ignored. While $14.50 for No. 2, Cleveland, is the usual price on Northern, sales have been made at $14.25. We quote as follows for Cleveland delivery, save on gray forge, which is at Valley furnace:

Bessemer	$15 50 to 15 75
No. 1 Strong Foundry	14 75 to 15 25
No. 2 Strong Foundry	14 25 to 14 50
No. 3 Foundry	14 00 to 14 25
No. 2 Southern	13 25 to 13 60
Gray Forge, Valley furnace	13 25 to 13 50
Lake Superior charcoal	17 00 to 17 50

Finished Material.—Owing to the high price of steel bars and low price of iron, sales of the former have almost entirely ceased in this district and there is strong pressure to bring about a reduction of the quotation on steel, which has so long been 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. Whether concessions will be made is not clear as yet, but certain it is that as long as conditions remain as they now are, steel will be bought only when iron can not possibly be used. Iron shows still further weakness. A sale below 1.30c Youngstown has been reported, but there was apparently a scrap deal connected with the transaction. The price is, however, about 1.35c at the mill and it is understood that jobbers can make purchases at 1.30c. Sheets are dull and prices lower. We quote as follows: Mill sales of black sheets, No. 27, 2.40c to 2.45c; No. 26, 2.30c to 2.35c; No. 24, 2.25c to 2.35c. The following are prices out of stock: No. 10, 2.10c to 2.20c; No. 12, 2.05c to 2.25c; No. 27, 2.65c to 2.75c; No. 28, 2.75c to 2.95c. Galvanized sheets are sold at 75, 10 and 5 off for large lots, desirable specifications, and 75, 10 and 2½ off for smaller lots. The fact that sheet bars are sold by independent steel interests below the pool basis enables independent sheet makers to maintain their position. Billets as well as sheet bars are weaker and the feeling of weakness has extended to several finished lines, though as yet without any revision of prices on which agreements exist.

Old Material.—The market is still extremely dull and weak. Mill scrap is from 50 cents to $1 lower, as are also iron rails. We quote the following, gross tons, Cleveland:

Old iron rails	$17 00 to 18 00
Old steel rails (over 6 feet)	13 00 to 14 00
Old steel rails (6 feet and under)	15 00 to 16 00
Old car wheels	16 50 to 17 00
Steel boiler plates	12 00 to 14 00
Malleable iron (railroad)	13 50 to 14 00
Malleable iron (agricultural)	12 00 to 13 00
Heavy steel	12 00 to 13 00

We quote the following net tons:

No. 1 R. R. wrought	$13 00 to 14 00
Mill scrap	10 00 to 11 00
No. 1 machine cast scrap	11 00 to 12 00
Iron axles	18 00 to 19 00
Axle turnings	10 00 to 11 00
Wrought turnings (free from cast)	7 00 to 8 00
Uncut wrought iron boilers	6 00 to 7 00
Grate bars	9 00 to 10 00
Pipes and flues (clean)	9 00 to 10 00
Tank iron	9 00 to 10 00
Hoop and band iron	9 00 to 10 00
Sheet iron	7 00 to 8 00
Wrought drillings	7 00 to 8 00
Stove plate	9 50 to 10 50
Steel axles	16 00 to 17 00
Cast borings	3 75 to 4 00

CINCINNATI.

Nov. 4.

The coke situation has not changed during the past week and the market is quiet and steady at $2.75 to $3 for foundry coke f. o. b. ovens Connellsville. A number of small orders are being filled, as buyers are conservative and are covering current needs.

Pig Iron.—The market continues easy in tone and further price concessions have been made during the week. Sales have been made on the basis of $9.50 Birmingham for No. 2 foundry. The open quotation today is $9.75 Birmingham. Early in the week an Ohio pipe manufacturer bought a considerable tonnage at $9.75 basis. The quantity was given out as in the neighborhood of 15,000 to 20,000 tons. This was the only large transaction reported. Prices are somewhat irregular. The bulk of the business going is still on the small lot order to cover present requirements. Buyers as a rule show no disposition to cover for next year or any part of that period. Sellers are in just the same attitude and are not offering to sell into next year at present prices. It is current talk that some furnaces are now taking orders which are netting them less than cost. It is stated that at the present rate of selling of Southern iron further accumulation of stocks in the South will stop and the statistical position will be stronger. Price concessions have caused a relatively large movement of iron in the past two weeks.

Negotiations are said to be under way for some export-

ing of pig iron but these transactions are not made through the sales agents here and are made by the furnaces direct. The market has an appearance of weakness and raggedness. The following are the prices current, f. o. b. Cincinnati:

Southern Foundry No. 1	$12 75 to 13 25
Southern Foundry No. 2	12 25 to 12 75
Southern Foundry No. 3	11 75 to 12 25
Southern Foundry No. 4	11 50 to 11 75
Southern Foundry No. 1 soft	12 75 to 13 25
Southern Foundry No. 2 soft	12 25 to 12 75
Gray forge	11 25 to 11 50
Northern Foundry No. 1	15 90 to 16 15
Northern Foundry No. 2	15 40 to 15 65
Northern Silvery (8% silicon)	18 65 to 19 15
Southern car wheel iron	19 75 to 20 75

Finished Material.—The market has made no improvement the past week and continues quiet and easy. The orders are for small lots and all along the line there is a disposition to hold off. Bar iron is easier than last week and a quotation of 1.45c Cincinnati has been heard, on car loads. Steel bars remain at 1.73c base, half extras, with the retail price 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.05c; No. 27, 2.95c; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.40c; No. 10, 2.30c. Tank plates are firm and sell out of store at 2.05c for ¼-inch and 2.15c for 3-16-inch. Beams and channels are quoted at 2c from stock, and angles at 2c for base sizes. The demand for merchant pipe is fairly good and the market holds steady and unchanged. Tubes are in moderate demand and prices are well maintained. The following prices are for car load lots:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed. Wrought Iron Pipe. Black. Percent.	Guaranteed. Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	68.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	37.7
1¾ to 2½ inch	54.2	36.7
2¾ to 5 inch	59.7	46.7
6 to 13 inch	54.2	36.7

Old Material.—The market is quiet and unchanged. We quote:

Old No. 1 railroad wrought, net tons	$12 50 to 13 00
Cast machine and foundry, net tons	11 00 to 11 50
Old iron rails, gross tons	18 50 to 19 50
Old steel rails, gross tons	16 00 to 17 00
Old short lengths, gross tons	13 50 to 14 50
Old iron axles, net tons	19 00 to 20 00
Stove plate, net tons	9 00 to 9 50
Wrought turnings, net tons	11 00 to 11 50
Cast borings, net tons	6 00 to 6 50

PHILADELPHIA.

Nov. 4.

Representatives of nearly all the pig iron producers in the Eastern district held a meeting Nov. 2 and adopted a resolution providing for the continuation of the curtailment of production during November as it was done in October. This action includes all the merchant blast furnaces in Eastern and Southern New York, Eastern Pennsylvania, Southern New Jersey, Delaware and Maryland, which will reduce their output for the current month. The production report for October showed that the total output of the furnaces involved was 68,500 tons. Makers of pig iron do not expect that prices will be higher, although they are near cost, but they do expect that costs will be reduced before spring. Persistent rumors are to the effect that lower prices than those publicly announced have been accepted on billets.

Pig Iron.—Sales have been somewhat larger, but deliveries are being made slowly on old sales, owing to requests for postponements. Southern No. 2 can be had at $14.25 delivered in buyers' yards. Ordinarily about $15.50 is quoted for Pennsylvania iron, but the market is uncertain and, for large tonnage, lower prices would be accepted. Buyers are extremely cautious. We quote: No. 1 X foundry, $16 to $16.50; No. 2 X foundry, $15 to $15.75; No. 2 plain, $14.50 to $15; Southern No. 2 rail shipment, $14.25 to $14.50; Southern No. 2 on dock, $13.75 to $14; standard gray forge, $13.75 to $14.25; ordinary gray forge, $13.25 to $13.50; basic, $14.50 to $15.

Steel.—There is a slow, dull market. Small lots are sold at $27; but on a large order 50c to $1 lower would be accepted. Prospects are not encouraging.

Finished Material.—Probably not a mill in this district has a month's business on its books. Prices held by agreement have not changed, but there is increasing agitation in favor of reduction of prices of steel bars and rails. Bar iron is lower and can be had at 1.45c delivered. Plates, beams, angles and steel bars remain at 1.75c to 1.80c.

Old Material.—There is little demand and prices are irregular, tending downward. We quote: Old steel rails, $12.50 to $13; miscellaneous heavy steel, $12 to $12.50; low phosphorus scrap, $20 to $21; old steel axles, $16 to $17; old iron axles, nominal, $19 to $20; old iron rails, nominal, $16.75 to $17.50; old car wheels, nominal, $15.50 to $16; choice R. R. No. 1 wrought, $16 to $16.50; country scrap, $14 to $14.50; machinery cast, $13 to $14; No. 2 light scrap, forge, $12 to $12.50; No. 2 light scrap, ordinary, $9.50 to $10; axle turnings, $11.50 to $12; wrought turnings, $10 to $10.50; wrought turnings, choice heavy, $10.50 to $11; cast borings, $6.75 to $7.25; stove plate, $10 to $11; wrought iron pipe, $12 to $12.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Nov. 4.

Pig Iron.—The trading in the local pig iron market is still confined to small lots, but orders are booked so frequently that the aggregate tonnage is large. Just at present Southern interests are the most active, and dispose of their output at all sorts of prices. One large concern which has been holding out for $10.50 for No. 2 foundry at Birmingham, reduced its price to $10 during the week, but one of its chief competitors has been asking $9.75, and captured some excellent business in consequence. The situation is such at this writing that a large purchaser could even do $9.50. The representatives of Northern furnaces report that only a fair tonnage is being placed, with the price entirely governed by the quantity. There is no doubt that large propositions would bring forth some inviting offers. Foundrymen are fast reaching the end of the contracts on their books. During the past week representatives of foundry interests in Pennsylvania visited this vicinity, trying to drum up trade, and asserted that they had fewer orders booked now than at any time since the boom period set in. Some in their anxiety to get business named prices that showed a considerable reduction over those they have heretofore been quoting. New York prices for iron are as follows: Northern No. 1 X, $15.75 to $16.25; No. 2 X, $15.25 to $15.75; No. 2 plain, $15.00 to $15.50; Southern No. 1 foundry, $13.75 to $14.25; No. 2 foundry, $13.50 to $13.75; No. 3 foundry, $12.75 to $13.25; No. 4 foundry, $12.25 to $12.75.

Billets.—Trading is confined to very narrow limits, and pool prices are being cut from $1 to $2 a ton. The market for German billets is at a standstill.

Finished Iron and Steel.—The only important development of the past week is a strong intimation that the much discussed possibility of a reduction in structural shapes promises soon to become a reality. This information comes from a very reliable source. Foreign structural material can be laid down at any tidewater point for from 1.60c to 1.65c duty paid. That it is not ordered in greater tonnage is due to the fact that deliveries from domestic mills can be had quicker, and to the belief that a reduction by American mills is likely to occur at any time. The American Bridge Co. expects that its sales for October, which have not been computed up to this writing, will amount to about 33,000 tons. Iron bars are still weak, and little difficulty is experienced in buying at 1.40c. Sheets are a little better, jobbing houses reporting somewhat more new business. Plates are dull, with mills engaged in keen rivalry for orders. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams,

2.05c to 2.25c; sheared steel plates, tank, 1.79c to 1.86c; flange, 1.90c to 2c; firebox, 2.10c to 2.20c; refined iron bars, 1.40c to 1.45c; soft steel bars, 1.70c to 1.75c; steel sheets, in carloads, New York, No. 28, 2.75c to 2.80c; galvanized, 75 and 10 to 75 and 5 off.

BIRMINGHAM, ALA.

Nov. 4

The probability of another car famine such as this section experienced a year ago, and the possibility of exporting 20,000 to 50,000 tons of Alabama iron, are the only features this week that tend to strengthen the market here. Some transportation lines are already having considerable difficulty in furnishing ample equipment for the iron offering, as there is naturally a great desire on the part of the manufacturers to move quickly their accumulated product. Practically all sales being made are for prompt or nearby shipment, as there is a general indisposition to believe that the present low level will be continued.

It is generally reported here that there is strong probability of a combined effort to place 50,000 tons of iron on the other side, and rates have been secured as low as $2 per ton from Birmingham to foreign ports. Even though this tonnage might have to be placed at a loss, it is thought it would be advisable to place it in order to help out the situation here as to stocks on hand and stimulate home demand. If this were done, it is not thought there would be any necessity for further consideration of the plan for curtailment of product and that the mines, coke ovens, etc., would be enabled to continue in full operation, insuring employment to all labor in this section.

There has been some further lowering of prices the past week, No. 2 foundry having been reported as selling at $9.75 Birmingham, and as low as $9.50 has been done. Such prices, however, are the exception. For standard iron, well up to grade, $10 is being obtained, notwithstanding the persistence of buyers in their efforts to further force prices downward. We make the following quotations:

No. 1 Foundry	$10 00 to 10 50
No. 1 Soft	10 00 to 10 50
No. 2 Foundry	9 75 to 10 00
No. 3 Foundry	9 00 to 9 50
No. 4 Foundry	8 75 to 9 00
Gray Forge	8 50 to 8 75

Pressed Steel Car Co.'s Report.

The pressed Steel Car Co.'s statement of operations for the quarter ended Sept. 30 shows a decrease in net earnings of $716,562, and in surplus after allowing for the preferred dividend and depreciation reserve of $693,996. For nine months the net earnings decreased $660,571 and surplus $637,906.

The detailed statement for the quarter ended Sept. 30, with comparisons, follows:

	1903.	1902.	Decrease.
Net earnings	$628,964	$1,345,526	$716,562
Fixed charges	47,100	59,224	12,124
Net income	$581,864	$1,286,302	$704,438
Proportion preferred dividend	218,750	218,750	
Balance	$363,114	$1,067,552	$704,438
Depreciated reserve	70,000	80,442	10,442
Surplus	$293,114	$987,110	$693,996

The company reports for the first nine months of the calendar fiscal year:

	1903	1902.	Decrease.
Net earnings	$2,644,167	$3,304,738	660,571
Fixed charges	142,394	179,336	36,942
Net income	$2,501,773	$3,125,402	$623,629
Proportion preferred dividend	656,250	656,250	
Balance	$1,845,523	$2,469,152	$623,629
Depreciated reserve	225,000	210,723	*14,277
Surplus	$1,620,523	$2,258,429	$637,906

*Increase.

The company has declared the usual quarterly dividend of 1¾ percent on its preferred stock, payable Nov. 25, and the usual quarterly divident of 1 percent on its common stock, payable Nov. 30. The board of directors has also directed the payment of the fourth installment of the extra dividend of 1 percent on the common stock, authorized by the board in January last, to be paid at the same time as the regular common dividend.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Nov. 4.

Pig Tin.—The course of the market during the past week was downward. This was due to heavy arrivals, and to the slow demand from consuming sources. On the other hand the London market has been strong, and prices are up over £1 compared with those prevailing a week ago. The monthly statistics, published by Secretary Mayer of the Metal Exchange, show deliveries to have been 2,700 tons, and arrivals 3,810 tons. The world's visible supply for the first ten months of the present year is 15,515 tons, against 16,053 tons for a similar period last year. The statistics are regarded as favorable. Closing prices at the Metal Exchange today were as follows: Spot to December, 25¾c. London closed today as follows: Spot, £118 12s 6d; futures, £119 5s.

Copper.—While the official quotations remain unchanged, all brands are being offered in the open market at ¼c less. Trade conditions still continue to be so unfavorable as to make the closing down of the amalgamated mines in Montana little of a factor. The trade expects some important developments in the near future between the warring copper interests, and is disposed to proceed cautiously pending their promulgation. The London market during the week was fairly firm, and prices underwent but little change. Statistics show the exports for October to have been 12,846 tons, and for the first ten months of this year 107,726 tons, against 142,686 for a similar period last year, a most unfavorable showing. Closing prices at the Metal Exchange today were as follows: Lake, 14c; electrolytic, 13¾c; casting, 13½c. London's closings today follow: Spot, £59 2s 6d; futures, £58 15s.

Lead.—Unchanged here at 4.50c. St. Louis is lower at 4.25c. London is weaker at £11 5s.

Spelter.—Spot is slightly lower at 6c. November is 5.55c. St. Louis is weaker at 5.55c. London is strong at £21.

Antimony.—Cookson's is 7¼c, Hallett's 6¼c, and outside brands 5¾c.

Quicksilver.—Is quoted at $47 per flask of 67½ pounds in lots of 100 flasks. London is £8 7s 6d.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c and 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Nov 4.

Copper has declined again since the advance of a week ago, and is now ¼ of a cent lower. The price, however, is still ¾ of a cent more than what it was prior to the shutdown of the Montana mines. Demand is quiet and purchases are limited to small lots. Other metals are sluggish, and prices are without change. We quote Lake copper, carload lots, 13¾c to 14c; casting, 13⅝c to 13⅞c. Pig tin, carloads, 26¼c; lesser lots, 26¾c. Pig lead, 4.40c in 50 to 100-ton lots, and 4½c to 4¾c in small quantities. Spelter, 5.60c in carload lots, and 6c in small quantities; sheet zinc, 6¼c; antimony, 7½c to 8c for both Cookson's and Hallett's.

Old metals have improved in tone and prices are slightly firmer. We quote dealers' selling prices as follows: Copper wire, $11.50 to $11.75; heavy copper, $11.25 to $11.50; light copper, $10.50 to $10.75; red brass, $10 to $10.25; red brass turnings, $8.50 to $8.75; yellow brass, $7.50 to $7.75; yellow brass turnings, $6.50 to $6.75; lead, $3.90; zinc, $4.25; pewter, $17.

The steel plant of the Alabama Steel & Wire Co., at Gadsden, Ala., will not be completed for several months, though the buildings are erected and practically all the machinery is on the ground. It is a question of getting the brick work done. The blast furnace will be ready to blow in by Dec. 1. The company's rod and wire mills at Ensley are shut down awaiting steel from the Gadsden plant.

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THE TURN TOWARD EXPORT TRADE.

It is as foolish as it is harmful to refuse to recognize the fact that, as far as the iron and steel industry is concerned, we have crossed the crest of the wave of greatest activity and handicapped by the ill burdens of great prosperity are on the decline as far as strictly domestic trade is concerned. But while we are passing through a lull in home commerce we are on the eve of an enlarged international trade. In fact, the master minds in the iron industry predict the development of a foreign trade within the next two years, greater than ever in our history. The American invasion, of which European nations ever since the Spanish-American war have lived in fear, will become a living and an aggressive reality.

But before this can come to pass there must be radical changes throughout all departments of business at home. Lower costs of production of raw, intermediate and finished material are essential, and along with these a lower wage scale is absolutely necessary. Willing or unwilling the laborer and the mechanic, the skilled and the unskilled, must submit to a readjustment sooner or later, and the sooner these facts are realized the speedier will industrial equipment find full employment. The employer must be contented with less profit, and the cost of living must find a level more commensurate with the decreased purchasing power of the people. The readjustment has but just begun, but it will continue more or less steadily until a firm basis on a lower level has been secured—on a level where it will be possible for American manufacturers to meet in successful competition the products of foreign countries in neutral markets, and possibly in some instances even in protected spheres. American ingenuity and American methods both in manufacture and in trade must be relied upon to overcome our disabilities in other directions. But no one with a just appreciation of the resources of this country and the character and vitality of the people can long doubt the outcome. The first and most important element to be developed is a full realization by both employer and employee of what it is necessary to accomplish, and the appreciation by both of the sacrifices required by the shifting of industrial conditions.

The wonderful prosperity of the past few years is responsible for many trade abuses, both by capital and by labor, and these must be eradicated, more or less completely, before we can expect to mount the ladder of foreign trade. The wild speculation in exportable products, too, by which we have dammed our own commercial channels, must be cast into the scrap heap of lost endeavors. But such a state is not likely to be reached quickly. Our position can only be secured by strong and determined effort, and our worst struggle will probably be with ourselves. Labor and capital alike will put off the day of reckoning; it is a trait of human nature.

Much will depend, too, upon the attitude and the methods employed by large exporters to secure foreign business. If an effort is made seriously to put into practice a system similar to that of the German kartel which exacts high prices from the domestic consumer and gives a large differential to his foreign competitor, strong protests may be looked for from the domestic interests affected, and it may be expected that legislative action will be invoked on the tariff issue involved.

It is not to be lost sight of, however, that many inequalities will inevitably arise during the transition period, and in dealing with such instances the exercise of patience will be necessary. That the time has now come to make the export trade a permanent factor in our iron and metal working industries, as our steel manufacturers have been promising to do on the return to a more normal home demand, is the important and immediate fact. How labor and capital may co-operate to the largest advantage of home industry is the problem that must be worked out wisely, perhaps at times painfully.

SOLIDITY OF WESTERN BUSINESS CONDITIONS.

There is one feature of the business situation which invites special attention at the moment. This is the contrast between the pessimism or rather the ultra-conservatism of the East, and the hopefulness if not the credulity of the West. We find an explanation of the Western attitude in the fact that the farming and other producing classes in that section are freer from debt and possessed of more property than ever before, and it is also true that there is a greater volume of money in circulation among the people and more in banking institutions to their credit than at any previous time. The people of the West are closer to nature, to the earth and its direct fruits. The people of the East are more dependent upon one another, and hence more cautious in temperament.

While our great prosperity has come as the result of legitimate causes and has rested upon firm foundations, it is manifestly impossible to maintain a high pressure indefinitely. But such has been the velocity of our progress and so great the mass of business that the momentum will carry us well forward into the Presidential year with but slightly diminished volume. It must be apparent, however, to the most casual observer what is the general tendency.

Developments in the financial world during the past

ten days have been profoundly interesting and we may draw important conclusions from the movements of money and exchange. Millions of currency has been shipped from New York to the Western and Southern centers and from those points into the country districts. There is nothing unusual in this at a time when crops are to be moved, but the fact that the shipments were the heaviest ever made in any one week attracted attention. The explanation, however, is that the runs on some of the savings banks at St. Louis necessarily caused an immediate fortifying of reserves. The incident is important as illustrating how sensitive capital is, and how speculative "corners" may derange legitimate trade and alter money currents.

One of the most reassuring features of the past week has been the offering of commercial sterling bills drawn against exports of wheat and cotton. These coming upon the market in greater volume than for many weeks and simultaneously with an improved London demand for American securities, and more active money, have brought exchange to a point where gold imports are seriously considered. We need have little fear of our financial prospects.

Whatever errors of commission or omission have been brought to light in the industrial and financial worlds recently it is evident that the foundations of business are sound and will not be seriously disturbed by the readjustments which must naturally be anticipated.

HEAVY DECREASE OF IRON AND STEEL IMPORTS.

The report of the Department of Commerce for September shows a decided decrease in imports of both iron and steel, the former having fallen from 40,475 tons in August, 1903, and 82,196 in September, 1902, to 16,414 tons last September. Imports of steel have fallen from 39,027 tons in August, 1902 and 20,380 last August to 13,530 tons in September. The imports of iron and steel for the first nine months of 1902 and 1903 were as follows in gross tons:

	1902		1903	
	Pig Iron.	Steel.	Pig Iron.	Steel.
January	7,833	5,312	110,679	38,691
February	8,307	2,235	45,187	20,151
March	17,184	6,570	59,628	31,464
April	19,067	11,986	99,944	29,014
May	30,708	24,380	57,139	26,389
June	32,458	35,588	79,874	30,530
July	62,156	37,150	38,046	33,070
August	79,447	39,027	40,475	20,380
September	82,196	27,727	16,414	13,530
	339,406	188,958	547,386	243,210

The imports of iron and steel for September and for the nine months for the articles named were as follows:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	September		9 mos. end'g Sept.	
	1902.	1903.	1902.	1903.
Pig iron	82,196	16,414	339,406	547,386
Scrap	12,079	1,964	75,488	74,103
Bar iron	6,547	2,362	21,124	31,960
Iron and steel rails	11,560	2,196	35,023	87,273
Hoop, band or scroll	117	42	3,184	1,432
Steel ingots, slabs, billets or bars	27,726	13,530	188,958	243,210
Sheets and plates	470	1,057	4,726	7,895
Tin and terne plates	4,396	2,440	46,871	36,211
Wire rods	1,337	1,390	14,108	15,319
Wire and wire articles	154	470	2,446	3,748
Total	146,582	41,874	729,210	1,048,537

The total value of iron and steel imports for September, not including ore, but including some manufactures not named in the above table, is $2,362,704, against $4,381,471 in September, 1902. For the eight months the totals are: For 1903, $34,652,229; for 1902, $27,838,237. For the month the value of exports, not including ore, but including some manufactures not named in the table, was: 1903, $7,373,346; 1902, $7,447,187; for the eight month, $72,714,356, in 1903, and $73,352,016 in 1902. The following table gives the exports for the articles named:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	September		9 mos. end'g Sept.	
	1902.	1903.	1902.	1903.
Pig iron	1,298	1,120	23,571	11,984
Scrap	1,019	202	7,778	3,130
Bar iron	1,839	1,305	18,719	15,289
Wire rods	496	683	15,246	19,043
Steel bars	639	532	7,645	13,784
Billets, ingots and blooms	270	37	2,064	1,056
Hoop, band or scroll iron	80	146	1,395	1,433
Iron rails	33	.....	210	143
Steel rails	3,035	6,487	63,071	11,6 1
Iron sheets and plates	397	1,693	2,860	4,357
Steel sheets and plates	1,029	518	11,677	9,082
Tin plates, terne plates and taggers' tin	79	1	1,374	169
Structural material	4,122	1,895	45,970	22,565
Wire	5,202	6,110	72,006	76,231
Cut nails	402	1,059	5,501	6,789
Wire nails	1,704	1,960	19,368	22,357
Other nails, including tacks	131	168	1,388	1,636
Total	21,595	23,886	299,790	220,659

It will be noted that there is a large increase in exports of steel rails compared with September, 1902. Compared with August, 1903, when the exports were only 371 tons, the increase is all the more striking. The exports of iron sheets and plates in August, 1903, were 279 tons and 1,693 tons last September. Exports of wire show a decrease compared with the preceding month.

The Steel Billet Agreement.

(Special Telegram.)

NEW YORK, Nov. 4.—It is reported that as the result of the recent cutting of prices, the agreement on steel billets has been dissolved, but no authentic confirmation of the report can now be obtained. It is stated that the Clairton Steel Co. is not now a party to the agreement. Rumors have been current in the past few days that the billet association would be dissolved this week, or in the event of continuing, would make a reduction of $3 or $4 from the basis recently maintained.

Policy of the U. S. Steel Corporation.

The following statement has been made by an official of the United States Steel Corporation, outlining the company's policy as to prices and wages: "There will be no cut in prices. Rates will be maintained. As for the matter of wages, that has not been considered save in an informal way. At any rate, no changes of this kind are likely before the new year. The matters now under discussion by the heads of the subsidiary companies are almost all of a routine character, though considerable thought is being given to economy of operations." The statement, it will be seen, does not say how long it is expected to maintain prices. In billets they have already fallen.

Reported Export Sale of Tin Plates.

The report that the American Tin Plate Co. has secured an order for Canadian delivery of 150,000 boxes has been denied by officials of the export department of the United States Steel Corporation. Despite the closing of the canning season a large number of tin mills continue in operation. Of the 78 independent tin mills in the country, 48 are in operation at the present time, while of its 258 mills the American Tin Plate Co. is operating 131.

Five of the new sheet mills of the Wood plant of the American Sheet Steel Co., McKeesport, Pa., were placed in operation this week.

The Leechburg, Pa., plant of the American Sheet Steel Co., resumed operations this week after an extended idleness.

The Ericsson-Moore Mfg. Co., Detroit, capital $5,000, has been incorporated to manufacture dies, tools and sheet metal goods.

Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Nov. 4.

Visits to the manufacturing districts of Cleveland afford convincing evidence that the boom season has passed. The foundry is a pretty reliable barometer of conditions in the iron business, and now the foundries find there is a decidedly decreased demand for castings. There is, consequently, a smaller melt of iron, and some plants have made a large reduction in the number of molders. Interests closely allied with foundries feel the changed conditions most keenly at present, but there are few plants at which there is not less work being done than there was a month or two ago. The prevailing feeling is not pessimistic. While it is generally expected that business will be less active this winter than it was last winter, there is general confidence that the country will not see any such a period of depression as it did in the depression beginning ten years ago. Increased efforts are being made to extend the foreign trade. In some cases in which there is urgent demand for money, goods are being sold at a sacrifice. A sales agent says:

"Business is extremely good at the present time in all lines, but prices are very low. In fact in some cases I know the manufacturers are selling at a loss in order to get rid of their stock. Six months ago the best discount you could get from any of the mills was 1 percent, ten days, and the majority of the mills would not allow 1 percent, making it 30 days net. At the present time all of the mills allow you 2 percent and from 60 to 90 days. I think before the first of the year we will see a change for the better in prices."

A prominent manufacturer of machine tools says: "It is true that there is a marked depression in business, and the writer thinks that it would be a wise man who could tell how long it will continue. There has been no extraordinary change in prices so far as we are concerned, but it looks to me as though there may be a drop in prices before very long unless business improves."

E. H. Dyer & Co., builders of sugar machinery, report that there is a general falling off, but they add: "We are of the opinion that should the volume of business decrease 25 percent there will be no serious loss as we think the industries at large could stand it without any material loss in their profits, owing to the fact they could work to better advantage. We feel that to be the case regarding ourselves. We have closed a $750,000 contract with the Fremont Sugar Co., Idaho, for the construction of a beet sugar plant for them before next season's crop."

The C. O. Bartlett & Snow Co. reports that it is busy and looks for a good business the coming year, especially in cement machinery.

The Cleveland Pneumatic Tool Co. reports that business is good, especially in foreign orders. One of the officers of the company says: "We see nothing in the conditions of the business of this country today to suggest any view of the situation but an optimistic one. We do not believe that the time ever was in this country when conditions should be better from natural causes than that of today. The increase of wealth in the past six years has been marvelous, and while the water has been squeezed out of the stocks representing so many different lines of industry there is not a dollar of real value lost. The 'lambs' have been shorn by the 'shepherds' of Wall Street. But Wall Street is not the barometer for business in this country, and if there was neither a Wall Street nor a New York Stock Exchange the country would be better off. Gambling produces nothing; it merely shifts title or ownership. There is not a bank or trust company in the United States that should not be entirely solvent unless it has been connected with wild and unwholesome schemes of promotion. That there has been a let-up in the demand for iron, steel, machinery, and allied interests goes without saying. These conditions will disappear; capital and labor will get on more favorable terms, and everything will go along nicely in our opinion."

The Chisholm & Moore Mfg. Co. reports that the month just closed was the largest of the year as to volume of business and prices have been satisfactory. As to general conditions, Vice President Moore says: "It is most difficult to predict with any degree of certainty what the future has in store for us. It would seem to us, however, that we are at present merely passing through that period of contraction which invariably follows one where everything has been very largely inflated, as has been the case during the last two years. We do not feel that there is any reason for any great apprehension from this cause; in fact, it is really an element of safety and we are settling down to a more normal condition of things, which will run along through a number of years without any question. The trade of the country is still very large and will undoubtedly grow with the general growth of the country. We think it a great mistake for any one to cry 'Wolf' at this time, for the reason that if everyone takes up this strain, it certainly will have the effect of depressing business and in a very great measure creating a loss of confidence."

The Elwell-Parker Electric Co. reports it has a fair amount of routine orders and recently contracted with the Hocking Valley Ry. Co. for the electric light plants for two of its associated systems. President Phillips says: "We do not see anything in the present situation to justfy uneasiness and much less, alarm. Unfortunately, there are a good many people about, who are unreasonably sanguine and happy in a rising market and equally unreasonably pessimistic and unhappy when prices fall somewhat and when business lets up a little. These people do not study the conditions and form views and opinions of their own, but they are influenced from day to day by temporary and transient conditions. Unfortunately the very people who manufacture the credit of the community, to wit, the bankers, are at the same time, perhaps, the most conservative and often the most timid; therefore, when any little change for the worse takes place, a more than proper contraction of credit follows, with a consequent undue restriction of business—a restriction that has no real justification from the conditions of trade. The size and the richness of this country and the magnitude and importance of our foreign trade relations, positively forbid the idea of anything like disaster and anything more than the temporary depression in our trade. Therefore it is, that we ourselves jog along more or less contentedly, making the most of the present and having sufficient hope for the future. We don't paint anything blue in our business or in our minds, if we can help it. The wise man will often make as much money by buying at low prices at bad times as by selling at high prices in good times. The present situation in the stock market makes the writer think of a strong, healthy, man who has some dropsy or pleurisy and from whom the doctors have wisely drawn off the surplus water, so that now the patient is moving on to a much better condition than he was in formerly."

The Standard Welding Co. believes that a conservative feeling now dominates the business world. It sees no indication of early change and is satisfied with the situation and prospects.

The product of the Cleveland Steel Co. is light steel plates, the demand for which shows some improvement of late, but it is not sufficient to keep the producers running full. The company does not regard this improvement as being more than temporary, as the season is near at hand when a light demand is annually expected. It is, however, encouraged to look for better business, by the general conditions, which it believes are surely favorable to continued prosperity.

The Snider-Hughes Co., manufacturer of pumps, has lately closed a number of large contracts, and is now running its shop 13 hours a day. The indications are that it will be very busy all winter.

The Parish & Bingham Co., manufacturer of cold pressed metal work, has recently purchased the business and good will of The American Tubular Wheel Co., of Pittsburg, and will add to its line of manufacture the all steel wheel for vehicles, automobiles, and heavy trucks, which has been manufactured by the Pittsburg company. The company reports that the condition of its business is very satisfactory at the present time, and it sees no particular reason why this condition should not continue for at least the next six months.

The Cleveland Crane & Car Co. reports that conditions have changed very materially within the last three weeks. The company is still busy, but upon contracts placed some months

ago. It has no new work ahead, and prospects for immediate receipt of contracts to keep the works running are apparently very slim. Collections are exceedingly slow and often delayed fifteen to thirty days beyond their time limit. The company has not as yet made any material cut in its working force and trusts conditions will sufficiently improve so that it will not have to do so; but, should conditions continue as they are at the present time, a radical change in its working force must be made.

The National-Acme Mfg. Co. has noticed a marked falling off in orders in its product department, but the machinery end is still running up to its full capacity; in fact, is running overtime in part of it, so that on the whole business is really good.

The Marshall & Huschart Machinery Co. advises us that business seems to be picking up, as inquiries are more numerous, and deals are closing in better shape than they did in September.

The Vulcanus Forging Co. reports that business at the present time is anything but satisfactory or encouraging. The company has no doubt, however, that about the first of the year when present stocks are depleted the situation will improve considerably. The company is making extensive changes in its shop and expects to install new machinery before the first of the year.

The Cleveland Elevator Bucket Co. states that it finds business slack and collections slow, although its business for the year has been very encouraging.

The Star Automobile Co., Cleveland, O., organized a year ago to manufacture gasoline automobiles, has decided to withdraw from the business. The machinery will be disposed of and the plant used for other purposes.

The Garry Iron & Steel Co. reports that while business has been rather quiet for the past few weeks, things are looking much better and, from the amount of work in sight, and the reports which the company receive, it judges there will be a general improvement very shortly. The company has just installed some new machines in the machine department to care for the ever-increasing work in that line. It very recently received an order for one of its standard 4,000-pound capacity revolving puenmatic cranes from the New York Central & Hudson River Ry., to be used at West Albany, N. Y., and one from the Louisiana & Arkansas Railway Co., for its Form "E" 3,000-pound crane, this being the second crane it has furnished to this railway in the last four months. It has also been awarded contract for the structural steel work required in connection with the annex at Central High School, Cleveland.

Limit of Output in Independent Sheet Mills.

President T. J. Shaffer, of the Amalgamated Association of Iron, Steel & Tin Workers, claims that he has not yet received a request from the sheet and tin plate manufacturers' association to call a special convention of the sheet workers for the purpose of taking up the question of removing the limit of output. At a meeting of the sheet and tin plate interests, held in Pittsburg last week, a resolution was passed requesting President Shaffer to call another convention of the sheet workers. As soon as this request comes to the Amalgamated officers a meeting will be called, and it is altogether probable that the limit of output will be removed, as the independent mills claim that they cannot compete at present with the non-union mills of the American Sheet Steel Co., where the limit of output is entirely removed. If the limit is not removed by the Amalgamated Association it is probable that concerted action will be taken by the independents along this line which would result in ousting the Amalgamated Association from all the independent sheet mills which it now controls.

The business of J. I. Perkins, Chicago, dealer in iron and tin, has passed into the hands of the Royal Trust Company as receiver. The assets are said to be less than $200,000, with liabilities of $210,000.

J. Howard Jones & Son, formerly at 34 Wabash Ave., Chicago, brokers in coal, coke and foundry supplies, have moved their offices to the Ellsworth Building, 355 Dearborn St., the same city.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Pittsburg Foundrymen's Association was held at the rooms of the Engineers' Society of Western Pennsylvania, Pittsburg, on Monday evening, Nov. 2. Herbert E. Field, of Ansonia, Conn., presented an able paper on "Economy in Buying, Melting and Mixing of Iron," which was discussed at some length. It will appear in our next issue. Prior to the reading of the paper, Secretary Zimmers read his annual report, and resolutions were adopted on the death of the late Major Samuel W. Hay. A vote of thanks was tendered W. A. Bole, manager of the Westinghouse Machine Co., for the courtesy extended the Pittsburg Foundrymen's Association at the new Trafford City foundry of the Westinghouse interests.

The question brought up by Mr. Field that as strong an iron could be cast from a cupola as from an air furnace, caused considerable discussion. It was contended that a cupola was better adapted to the melting of small heats and was therefore more economical to operate than an air furnace, but those present who operate both air furnaces and cupolas were of the opinion that the air furnace produced far the best iron so far as strength was concerned. One foundryman, who stated that he had not gone into this question very deeply, said that he found that an air furnace produced iron of 12 to 15 percent greater strength than it was possible to secure from a cupola. With reference to holding iron in a ladle it was stated that this had been done successfully for a period of 2 hours and 45 minutes and that while the iron seems to cool very quickly, tests made showed that the cooling did not amount to more than 10 degrees every 15 minutes. Mr. Field also said that the use of machine cast pig iron caused a great saving to the foundryman, inasmuch as there was no sand to melt and dispose of and little slag was made and a smaller amount of flux is required.

Several of the foundrymen did not agree with Mr. Field that a large number of brands of iron were not necessary, as they claimed that oftentimes cases arose where the use of several different brands greatly aided the foundryman in his mixture. Some of the foundrymen were also of the impression that Southern brands of iron of nearly the same analysis as Northern brands produced entirely different castings. However, it was stated that from experiments made, where two brands of Southern and Northern irons of nearly the same analysis were used, the resultant castings were very much alike in all their properties.

A question was asked whether the iron in the bottom of the ladle did not differ considerably from that in the top. It was answered that from experiments it was found that the iron in both the top and bottom was very much alike in analysis; in fact, practically no difference at all was found. The following members and visitors were in attendance:

J. S. Seaman, Seaman-Sleeth Co.
Wm. Yagle, Yagle Foundry & Machine Co.
E. D. Frohman, S. Obermayer Co.
A. W. Slocum, Keystone Car Wheel Co.
B. D. Fuller, Westinghouse Electric & Mfg. Co.
W. J. Naeser, Yagle Foundry & Machine Co.
C. Klingelhofer and Daniel Werble, American Foundry & Construction Co.
C. L. Jackson, National Car Wheel Co.
John Birch, Pittsburg Malleable Iron Co.
J. Fox, H. K. Porter Co.
J. H. Robinson, Pittsburg Mfg. Co.
C. W. Townsend, Thos. Carlin Sons Co.
Daniel Ackerman.
Jas. Keegan, Frank-Kneeland Machine Co.
D. J. Thomas, Sterrit-Thomas Foundry Co.
H. E. Field, Ansonia, Conn.
Mr. Bitler, Lewis Foundry & Machine Co.
Martin Shurk, Keystone Car Wheel Co.
Mr. Houston, H. M. Hooker & Co.
J. S. McCormick, J. S. McCormick Co.
A. A. Lane, Taylor-Wilson & Co.
A. O. Backert, *The Iron Trade Review.*
S. H. Stupakoff.
John McLaren, Phillips & McLaren.
L. G. Blunt, Westinghouse Foundry Co.
Mr. Alexander, Mr. Knapp, S. F. Warren and Mr. Padgett, Pennsylvania Malleable Co.
Mr. Farnham, Whiting Foundry & Equipment Co.
G. P. Maury, Metallurgical Laboratory.
S. F. Warren, Pennsylvania Malleable Co.
W. J. Dorsey, Enterprise Foundry Co.
J. Hunter Sleeth, Westinghouse Air Brake Co.
W. W. Clark, Keystone Car Wheel Co.
F. H. Zimmers, Union Foundry & Machine Co.
Mr. Loudenbeck, Westinghouse Foundry Co.
J. Frazier, Fort Pitt Engineering Co.

Philadelphia Machinery Market.

PHILADELPHIA, Nov. 3.—The machinery trade noted a slight, very slight, improvement during October in comparison with the September business. This, however, is not saying much. The market is disappointingly dull and marked improvement can now hardly be looked for until the turn of the year. The attention of buyers has been attracted to different happenings in the business world which have tended to destroy confidence in the industrial condition of the country, and until the horizon is a little clearer, conditions are likely to continue as at present. That a tremendous amount of business is being held up is undoubtedly true, and there is little prospect of its turning in for a few weeks at least. Perhaps the strongest feature of the market, as signifying that a change for the better is to be expected, is the large number of inquiries coming in. There are few establishments only where inquiry can be reported unsatisfactory. In standard lines some good business has been done, but it is very evident that a more than usual amount of shopping has been resorted to before the placing of orders.

A few reductions in working forces have been made during the month, twenty-five machinists being laid off in one tool building plant alone. The closing of an auxiliary shop of a prominent tool building concern is also freely spoken of as among the changes to take place within a few days. A good deal of local interest attaches to developments at the Pencoyd plant of the American Bridge Co. Rumors have been rife that an immediate closing up of the works will be the outcome. Another rumor, which gained credence, was that the plant was to be taken over by the Baldwin Locomotive Works. The latter, however, is quite unlikely to be verified. In addition to the mills in the plant which have been closed during the past ten days, orders were yesterday posted announcing the shutdown of the eight-inch mill after next Saturday. The working force at the plant will then be reduced to less than a quarter of the former force. Work on the large and substantial new machine shop continues, the installation of a good deal of the tools having been effected. It is understood, however, that many tools for this shop, on which bids were recently asked, have not been ordered.

The situation at the Bethlehem Steel Works is a little more encouraging to local supply men and machinery dealers. It appears to be a settled conclusion that the plant cannot be forced into a receivership.

The Midvale Steel Co. has about completed its plans for the new armor plate plant which it is to build to take care of the contract for armor plates recently awarded to it. Considerable machinery is to be purchased for the new plant, including an immense hydraulic press.

There is considerable activity at the League Island navy yard, the work in hand there being pushed along rapidly with day and night forces. A further $100,000 is recommended to be expended in extending the electrical service at the yard.

At the Baldwin Locomotive Works great activity continues, although the influx of orders is somewhat curtailed. The output during October was the largest in the history of the plant, two hundred locomotives being turned out. More than half of these were for the Pennsylvania and Wabash railroads.

The foreign demand for machinery has improved considerably, and inquiries are more plentiful than for some time past. The larger portion of these inquiries cover special machinery.

The Wilson Enameling & Plumbers' Supply Co., a new concern, is arranging to build a new plant at Allentown, Pa., and will require equipment to the extent of about $60,000.

The Hess Machine Works, builder of file making machinery, reports a good business for last month, the orders coming mostly from foreign sources. Some orders for special machinery were also secured.

The Newton Machine Tool Works found business fairly satisfactory for October, the demand running mostly for rotary planers, cold saw cutting off machines and slotters. Among the larger shipments was one covering an armor plate saw for the Cambria Steel Co.

The Falkenau-Sinclair Machine Co. reports a larger business during October than in the preceding month. The shipments were largely confined to standard presses and smaller tools. Among the more important shipments were a double-action press with a multiple system of punches and dies to Baltimore, Md.; a Taylor automatic tool grinder to Bethlehem, Pa.; and a quantity of hydraulic valves to Pittsburg, Pa. In the testing machine department the company is building for the Boston Navy Yard an 800,000-pound chain testing machine. This it is thought will be the largest machine of the kind ever built in this or any other country.

The I. H. Johnson, Jr., Co., builder of lathes, says business with it during October was as good as at any time during this year. The shipments covered, besides a number of small to medium sized lathes, a 66-in. by 30-ft. lathe to Florence, N. J.; two axle lathes to Western points; and three 25-in. lathes to other points.

The Espen-Lucas Machine Works is fairly busy at its plant, the output being mostly cold saw cutting off machines and boring machines. They are just bringing out a new cold saw, which, while small in size, will take work up to 3 inches in diameter, and will prove a convenient tool in many shops on account of its compactness.

At the works of the Tabor Mfg. Co. some good orders have been taken for molding machines. Business during the last six weeks has been good, and very much better than for previous months.

The Wilbraham-Green Blower Co. has a good deal of work in hand at its plant, covering rotary pressure blowers and exhausters.

New Blast Furnaces at New Castle, Pa.

Extensive improvements are to be made at the New Castle plant of the Carnegie Steel Co., which was shut down this week for repairs. No. 2 stack of this plant is to be torn down entirely and will be built on more modern lines, and when completed will be of the same size and capacity as stack No. 4, which was completed within the past year, and which is 106x23 feet. The work on the new stack which is to replace furnace No. 3 is progressing rapidly and from present indications will be completed shortly after the first of the year. Furnace No. 1 of this plant is to be relined and many improvements are to be made to the stack. It is not probable that furnaces Nos. 1 and 4 will be placed in operation in less than a month or that operations will be resumed until the first of the year. In the meantime the steel plant will remain idle and many repairs will be made. The tin bars for the New Castle plants of the American Tin Plate Co. will be shipped from the Ohio plant at Youngstown, O.

The Pittsburg Coal Co. formally took over this week the Monongahela River Consolidated Coal & Coke Co., a rival interest with headquarters at Pittsburg. At a meeting of the directors of the Monongahela concern J. B. Finley, president, H. C. Fownes, George I. Whitney, R. H. Boggs and Hugh Moren resigned as directors, and F. L. Robbins, president of the Pittsburg Coal Co., was elected to succeed Mr. Finley. The following Pittsburg Coal Co. directors were elected to serve in the same capacity in the river combine: John A. Bell, W. R. Woodford, H. W. Oliver and A. V. Mellon, C. G. McIlvaine will continue as general counsel. Mr. Whitney, treasurer of the river company, and George W. Theis, secretary, will continue in their present offices.

At Chicago, Nov. 2, Judge Kohlsaat directed that the property of the United States Locomotive Corporation be sold to the highest bidder on Nov. 5. The property at Hammond, Ind., has been in possession of Edwin A. Potter, receiver in bankruptcy, for several months.

Dr. Wm. R. Thrall has been appointed receiver of the American Galvanizing & Tin Plate Co., Cincinnati. Estimated liabilities are $30,000 and assets $20,000.

The Pottsville Bolt Co., Pottsville, Pa., has shipped a carload of material for use in the erection of a Government building in Manila, Philippine Islands.

Citizens' Industrial Association of America.

More than 300 manufacturers and representatives of employers' associations and various local organizations of the Citizens' Alliance met in Kimball Hall, Chicago, on Thursday and Friday, Oct. 29 and 30, responding to a call for a delegate convention to plan for organized opposition to lawlessness and other abuses of trades unionism. It had been announced that the purpose of the convention was the formation of a federation of employers' associations and the question came up early in the proceedings, whether this idea was to prevail or whether an organization was to be formed broader in scope and following more closely the methods and lines of the Citizens' Alliance. The well known manufacturers' associations, including the National Association of Manufacturers, the National Association of Stove Manufacturers, the National Founders' Association and the National Metal Trades Association, were represented by delegates, as were many local manufacturers' associations, including those of the larger cities. Secretary Job, of the Chicago Employers' Association, had done most of the work preliminary to the convention, and the prestige of his association had been responsible for much of the representation of manufacturers' and other employers' organizations.

The final decision as to the character of the new organization was kept in abeyance through the first day's proceedings; but it was early apparent that the Citizens' Alliance movement was strongly influential on the floor.

The election of J. W. Van Cleave, president of the Buck Stove & Range Co., St. Louis, as chairman of the convention, was taken as an omen of a conservative outcome, Mr. Van Cleave having been prominent in the work of the National Stove Manufacturers' Association, whose allied organization, the National Stove Founders' Defense Association, has been on terms of conference, in a most satisfactory way, for many years. A. C. Marshall, of the Dayton, O., Manufacturers' Association, was made secretary. Mr. Van Cleave reminded the delegates that their meeting was a history-making one in respect to labor issues, and urged that such action be taken as would be sanctioned by public sentiment.

D. M. Parry, of Indianapolis, H. D. Morton, of San Francisco, and A. E. De Marge, of Bloomington, Ill., were made a committee on rules and order of business. A. C. Marshall, of Dayton, O.; E. G. Hornbrook, of Kansas City, Mo.; F. W. Job, of Chicago; B. F. Burke, of Marion, Ind., and ex-U. S. Senator Sanders, of Helena, Mont., were appointed a committee on credentials. The following were reported as accredited delegates:

Akron, O., Employers' Association—J. F. Druckemiller.

Aurora, Ill., Fox River Valley Manufacturers' Association—W. S. Frazier, Jr., B. E. Sperry, F. R. Jones, H. G. Shumway, D. W. Simpson, Joy Love, E. S. Hobbs, H. A. Hiwell, W. Shopbach, F. S. Florsheim, C. H. Smith and W. W. Stevens.

Birmingham, Ala., Citizens' Alliance—J. C. King and N. F. Thompson.

Beloit, Wis., Citizens' Alliance—Alonzo Aldrich, Joel B. Dow, Chas. V. Herriman and Porter B. Yates.

Bloomington, Ill., Citizens' Alliance—H. W. Stillhamer, A. E. DeMange, J. H. Rowell, H. H. Green and S. R. White.

Bridgeport, Conn., Manufacturers' Association—A. H. Bullard.

Canton, O., Employers' Association—H. C. Pontius.

Colorado Springs, Colo., Citizens' Alliance—J. C. Craig.

National Metal Trades Association—E. F. DuBrul, Cincinnati; W. P. Egan, Chicago; S. W. Watkins, Milwaukee.

Cincinnati, O., Employers' Association—E. F. DuBrul, Irwin M. Krohn and E. M. Lawton.

Cincinnati, O., Boot and Shoe Manufacturers' Association—Irwin M. Krohn and W. S. McKenzie.

Cincinnati, O., Contractors' Association—Archibald Colter and E. M. Lawton.

Cheyenne, Wyo., Citizens' Alliance—Hobart W. Martin, Hon. Geo. W. Hoyt and Leopold Kabis.

Chicago Employers' Association—Frederick W. Job.

Chicago Building Contractors' Council—W. D. O'Brien and E. N. Craig.

Chicago Typothetæ—Dan'l C. Shelley.

Chicago Employers' Association of Wood Industries—E. E. Hooper.

Illinois Manufacturers' Association—Bernard A. Eckhart and Jno. M. Glenn, Chicago.

Cook County Founders' Association—D. Hueginin.

Chicago Carriage and Wagon Manufacturers' Association—F. L. Meckle, Chas. D. Heile and Louis A. Heile.

National Saddlery Manufacturers' Association—Henry Othmer, Chicago.

Chicago Architectural Iron League—M. Benner and A. E. Coleman, delegates, and R. Vierling and W. B. Gervais, alternates.

Laundrymen's National Association—J. A. Barkey, Chicago.

Chicago Cloak Manufacturers' Association—Victor W. Sincere, who represented also the Candy Manufacturers' Association and the Dyers' and Cleaners' Association.

National Association of Photo-Engravers—J. L. Schilling, Chicago.

Chicago Furniture Manufacturers' Association—P. D. Francis.

National Wholesale Tailors' Association—M. Vehon, Jos. Lamm, W. T. Brownridge, E. V. Price and Edward Rose, Chicago.

National Stove Manufacturers' Association—T. J. Hogan, Chicago.

National Brass Manufacturers' Association—W. D. Allen, Wm. M. Webster and Mr. Francis, Chicago.

Wholesale Sash Door and Blind Manufacturers of the Northwest—Nathaniel Green, Chicago.

Cripple Creek, Col., Citizens' Alliance—C. W. Airhart, L. F. Parsons.

National Cooperage Association—J. D. Hollingshead and A. S. Ray, Chicago.

National Association of Marble Dealers—W. E. Hill, A. Lautz, W. H. Evans, Peter Gray, Alex. Davidson, F. P. Bagley, Chas. McDonald and Mr. Miller, Chicago.

Durango, Col., Citizens' Alliance—R. E. Sloan and B. W. Ritten.

Denver, Col., Citizens' Alliance—J. C. Craig, Herbert George and G. W. Gildersleeve.

DesMoines Business Men's Association—John Sherman, James Linnane, J. O. Wells, W. L. Hind and C. A. Jay.

Dayton, O., Employers' Association—A. C. Marshall, John Kirby, Jr., S. S. King and W. J. Blakeny.

Dayton, O., Master Plumbers' Association—R. B. Moodie.

Dayton, O., Typothetæ—W. R. Funk and L. D. Reynolds.

Davenport, Ia., Employers' Association—A. Bergman.

National Founders' Association—John A. Penton, Detroit; H. W. Hoyt, Chicago.

Detroit Employers' Association—Jno. W. Whirl, F. W. Hodges, W. A. Frazer and F. T. DeLong.

National Electric Construction Association—E. M. McCleary, Detroit. Detroit.

Elmira, N. Y., Employers' Association—N. B. Payne.

Evansville, Ind., Manufacturers' Association—B. F. Bonbehrn, S. G. Rickwood and F. R. McPherson.

Evansville, Ind., Citizens' Alliance—A. C. Rosencranz, Richard Rosencranz and R. Manheimer.

Freeport, Ill., Employers' Association—R. R. Tiffany and Fred W. Hoefer.

Galena, Ill.—J. W. Coatsworth.

Grand Rapids, Mich., Furniture Manufacturers' Association—Geo. Davis.

Hartford, Conn., Manufacturers' Association—H. W. Kyte.

Hudson, N. Y., Manufacturers' Alliance—Henry R. Bryan.

Helena, Mont., Citizens' Alliance—H. O. Ferris, Hon. Wilbur F. Sanders, R. C. Wallace and Samuel Weinstein.

Idaho Springs, Col., Citizens' Alliance—J. R. Elgan.

Engine Builders' Association—W. M. Taylor, Indianapolis.

Indianapolis Manufacturers' Association—Col. Chas. Kahlo.

Joplin, Mo., Citizens' Alliance—E. C. Moats, H. E. Scoevern, J. G. Richardson, Judge L. A. Filmore and J. R. Jones.

Jamestown, N. Y., Manufacturers' Association—S. B. Broadhead, W. T. Falkner and W. E. Griggs.

Jamestown, N. Y., Builders' Exchange—Chas. Swanson and John Oldquist.

Kankakee, Ill., Citizens' Alliance—C. L. Moore, Frank McGrew and James Deebank.

Kingston, Ont., Employers' Association—G. A. Givens.

Kansas City, Mo., Employers' Association—E. G. Hornbrooke, Phil R. Toll, Geo. Creel, Franklin Hudson, W. Emmet Crosby and E. D. Hornbrooke.

LaPorte, Ind., Citizens' Alliance—S. M. Closser, Julius Barnes, W. M. Rumley, E. R. Hart and W. E. Higgins.

Leadville, Col., Citizens' Alliance—Geo. R. Becker.

Louisville, Ky., Employers' Association—S. T. Ballard, E. A. Quarles, Gilmer Adams and H. W. McCracken.

Louisville, Ky., Employers' Underwriters Co.—F. C. Nunemacher.

Minneapolis, Minn., Citizens' Alliance—J. H. Record, E. J. Phelps, H. N. Leighton, T. B. Walker and B. F. Nelson.

Marshalltown, Ia., Employers' Association—Geo. R. Estabrook and A. D. Meeker.

Massillon, O., Employers' Association—H. A. Croxton.

National Association of Master House Painters and Decorators—P. J. Peterson and S. J. Brown, Milwaukee.

Milwaukee Manufacturers' Association of Brass, Iron and Steam Goods—C. K. Sandborn and Wm. T. Doyle.

Milwaukee, Wis., Typothetæ—W. J. Myers.

Marion, O., Employers' Association—A. E. Cheney and S. E. Barlow.

Tri-City Manufacturers' Association—C. R. Stephens and C. E. White, Moline, Ill.

Montreal, Can., Shippers' Federation—Thos. Robb.

Marion, Ind., Employers' Association—J. L. Barley, C. N. Martin, W. I. Dick, Ira Emmons, T. J. Harrigan, B. Custer, W. F. Gillespie, Phil. Patton, Pasco Pell, Milton Pope, C. H. Dodge, Philip Matter, F. J. Gould, Chas. F. Waltz, B. J. Burk, Jno. McDonald, W. D. Hodson, Don C. Howell, W. M. Pickard, Geo. C. Harwood, M. F. Gartland,

R. J. Spencer, H. D. Thomas, W. M. Swanger and Jno. C. Haswell.

National Manufacturers' Association—D. M. Parry, Indianapolis; Marshall Cushing, New York; Wm. McCarrol, J. W. King; Geo. P. Bent, Chicago; Jas. C. Brush, St. Louis; J. W. VanCleave, St. Louis.

Manufacturers' Association of New York—Chas. N. Chadwick and J. T. Hoile.

United Typothetæ of America—Edwin Freegard, New York.

Merchant Tailors' National Protective Association of America—Berkley R. Merwin, Harvey A. Patterson and M. H. McCarthy, New York.

United States Export Association—F. B. Thurber, New York.

New Orleans, La., Carriage and Wagon Manufacturers' Association—Louis Oster.

Omaha, Neb. Business Men's Association—E. B. Branch, Euclid Martin, T. J. Mahoney, E. E. Bruce, W. H. McCord.

Paonia, Col., Citizens' Alliance—Chas. Oliver.

Peoria, Ill., Citizens' Alliance—Geo. H. Emory, Gerald Franks, J. N. Ward, I. W. Litchfield, Frank P. Lewis, Val Jobst, Jr., W. H. Colean, S. F. Atwood, D. M. Mayer, E. B. Hazen, Clarence Patterson, W. D. Dickson, W. H. Culme and E. G. Plank.

Peoria, Ill., Master Plumbers' Association—E. B. Hazen.

Pittsburg, Pa., Manufacturers' Association—Geo. Mesta and F. A. Zimmers.

Pittsburg, Kan., Citizens' Alliance—Dr. Chas. H. Hunter.

Pueblo, Col., Citizens' Alliance—A. J. Woodruff and C. W. Crews.

Quincy, Ill., Employers' Association—M. K. Weems and G. W. Earhart.

Rochester, N. Y., Sash, Door and Blind Association—Percival Dewitt Oviat.

Rochester, N. Y., Woodwork Manufacturers' Association—L. D. Reilly.

Rockford, Ill., Furniture Manufacturers' Association—P. A. Peterson.

Wisconsin Manufacturers' Association—P. R. Wackerhagen, Racine.

St. Paul Typothetæ—H. D. Brown and Homer P. Clark.

St. Paul Citizens' Association—J. W. Cooper, J. H. Beck, Geo. M. Tibbs and Albert Schuneman.

Syracuse, N. Y., Metal Trades Association—H. B. Crouse and H. H. Franklin.

South Bend, Ind., Citizens' Alliance—C. G. Folsom, Geo. H. Stover, Stuart McKibben, J. B. Stoel, Chas. Francis and J. D. Birdsell.

St. Joseph, Mo., Employers' Association—F. A. Olden, E. S. Douglas.

Spokane, Wash., Commercial Club—R. E. M. Strickland, W. H. Cowles.

Sedalia, Mo., Citizens' Alliance—Col. J. West Goodwin.

Springfield, Mo., Citizens' Alliance—A. Y. Ross, W. L. Garrett.

SanMiguel County, Col., Citizens' Alliance—E. L. Davis.

Sioux City, Ia.—A. L. Beach.

St. Louis Typothetæ—E. S. Hart, Walter Donaldson.

St. Louis Metal Trades Association—F. Schwedtmann.

St. Louis, Mo., Lumber Manufacturers' Association—Geo. K. Smith.

San Francisco Employers' Association—H. D. Morton.

Shelbyville, Ind., Citizens' Alliance—C. H. Campbell, Rev. W. J. H. Boetcker.

Springfield, Ill., Citizens' Alliance—Owsley Brown.

Electrical Contractors' Association of Ohio—W. H. Morton, Toledo.

National Electrical Contractors' Association—E. McCleary, Arthur Franzen, E. N. Lawton, Utica, N. Y.

Wilkesbarre, Pa., Employers' Association—W. C. Shepherd.

Worcester, Mass., Metal Trades Association—Chas. E. Hildreth.

Western Pennsylvania and New York Association of Builders and Contractors—C. W. Udy, Warren, Pa.

York, Pa.—A. B. Farquhar.

Youngstown, O., Manufacturers' Association—Harry A. Boyle.

The Alliance Idea Prevails.

The sessions of the convention were secret after the opening meeting. This was for the purpose of securing a freer expression from the delegates as to the work and methods of the new organization. The committee on constitution was in session far into Thursday night, and its report was determined largely by the discussions of the day. An influential element in the convention, well represented by the delegates from employers' organizations in New York City, were strongly in favor of an employers' movement which should federate the various employers' organizations of the country.

This proposal was stoutly opposed by the Western delegates, chiefly those representing the Citizens' Alliance movement. The discussion brought out something of the extent to which the Alliance movement has swept the West. Many of the delegates represented cities in which the boycott had brought almost a commercial chaos. Unions, in desperate attempts to win strikes had drawn almost the whole community into the conflict and had worked untold harm to business. Violence and intimidation had had sway in many cases, until the Citizens' Alliance, with its secret yet effective methods, had created a powerful counter current of law-enforcement. The success of this organization, as recited by delegates who belonged to it, gave strong reinforcement to the arguments of those who believed in enlisting in the proposed movement all classes in the community who believe in compelling labor unionists to respect the constitution of the United States and the laws of the States.

It was argued that what is especially wanted at this time is a campaign of education and law-enforcement; and that this can best be carried on by an organization enlisting employers, merchants, professional men, and employes who believe in the open shop and the right of a man to work where and under what terms he chooses. A feature of the Citizens' Alliance that had been worked most effectively was the card it issued to employes affiliating with it—a card securing for the holder special consideration at the hands of the Alliance in any city to which he might go.

The above and other considerations finally won those in the convention who had set out for an employers' association federation, to a movement that should enlist all classes of the community under the banner of law enforcement and the open shop. It was in harmony with this view that the following constitution was drafted, and after much discussion adopted with enthusiasm:

Constitution.

The report of the committee on constitution was unanimously adopted as follows:

ARTICLE 1.—NAME.

This Association shall be known as The Citizens' Industrial Association of America and shall be incorporated.

ARTICLE 2.—OBJECTS.

First. To assist, by all lawful and practical means, the properly constituted authorities of the State and Nation in maintaining and defending the supremacy of the law and the rights of the citizen.

Second. To assist all the people of America in resisting encroachments upon their constitutional rights.

Third. To promote and encourage harmonious relations between employers and their employes upon a basis of equal justice to both.

Fourth. To assist local, State and National Associations of manufacturers' employes, and employers in their efforts to establish and maintain industrial peace, and to create and direct a public sentiment in opposition to all forms of violence, coercion and intimidation.

Fifth. To foster and encourage, by legitimate means, individual enterprise and freedom in management of industry, under which the people of the United States have made this the most successful and powerful nation of the world.

Sixth. To establish a Bureau of Organization, for the formation of Associations favorable to the objects of this organization, and federating them with this Association.

Seventh. To establish a Bureau of Education for the publication and distribution of literature tending to foster the objects of the Association.

Eighth. To create and maintain a fund for such purposes, in harmony with and promotive of the objects of this Association, as shall approve themselves to the Executive Committee thereof.

ARTICLE 3.—MEMBERSHIP.

Membership in this Association shall consist of National, State or Local Organizations of persons, firms, corporations, or organizations which subscribe to the objects of this Association as set forth in the Constitution and By-Laws.

ARTICLE 4.—OFFICERS.

The officers of the association shall consist of a president, first vice president, second vice president, third vice president, secretary and treasurer, each of whom, except the secretary, shall be elected by ballot at the annual convention of the association, and who shall hold office until their successors are elected and have qualified.

ARTICLE 5.—CONVENTIONS.

Section 1. The association shall hold a convention each year and special conventions may be called by the president, at such times and places as the executive committee by unanimous vote, or by a two-thirds vote of its members upon the written request of at least 10 percent of the membership, may direct; and at such special conventions any officer may be deposed by a majority of the members present and voting. Notices of such meetings shall be given as are hereinafter provided:

Section 2. Five percent of all votes of the association as provided in the by-laws shall constitute a quorum at any of its conventions, and when not otherwise provided a majority of those present shall decide.

ARTICLE 6.—EXECUTIVE COMMITTEE.

Section 1. There shall be an executive committee consisting of fifteen members, of which the president, three vice

presidents and treasurer shall be members; the president shall appoint the remaining ten members, five to serve for one year and five to serve for two years.

Section 2. The executive committee shall constitute the governing body of this association. It shall be vested with full power and authority to put into effect the laws, resolutions and decisions of the association; by a two-thirds vote to make by-laws for the government of the association and to amend the same; to appoint the secretary, standing and special committees; to fill all vacancies which may occur in the offices and in the committees of the association for the unexpired terms thereof; to exercise general supervision over the receipts and expenditures of the association, but shall have no power to make the association liable for any debts in excess of the cash in the treasury not otherwise appropriated.

Section 3. The executive committee shall meet at the call of the president within fifteen days after, and at least one day prior to each annual convention and at such other times between said meetings as the president may request.

Section 4. The office of any member of the executive committe except the president and treasurer, who may be absent from any regular or special meeting of the committee, without giving notice to the secretary in advance of such meeting, may be declared vacant at the option of the members present at the meeting and the president of the association shall, thereupon, fill such vacancy.

Section 5. In the absence of the president at any convention of the association, the vice presidents, in their order, shall preside over the convention.

Section 6. In the absence of the president at any duly authorized meeting of the executive committee a chairman pro-tempore shall be chosen by and from the members present.

Section 7. Five members of the executive committee shall constitute a quorum for the transaction of business at any of its meetings, but in the absence of a quorum the president may appoint the number of members, pro-tempore, necessary to create a quorum from the membership of the association, and all business transacted at any such meeting shall be of the same effect as if transacted by a quorum of regular members.

Section 8. The executive committee may at any time submit any question relating to the objects and the affairs of this association to the members thereof to be voted upon by letter ballot, and the result of said vote shall be of the same force and effect as the vote of a convention.

Section 9. Duties of officers and employes of this association, other than as stipulated in this constitution and not in conflict therewith, may be defined by the executive committee.

Section 10. The executive committee by and with the consent of the president of the association shall have the power and authority to appoint such committees as it may deem necessary.

ARTICLE 7.

Section 1. All members of this association shall pay an initiation fee as follows:

National Trades Organizations.....	$100.
State Organizations.....	100.
Local General Organizations.....	50.
Local Trade Organizations.....	25.

All members shall pay dues at the rate of fifty cents per annum per employing members, but in no case shall the amount be less than $10 nor greater than $200 per annum.

Resolutions.

The report of the committee on resolutions—consisting of E. Martin, Omaha, Neb.; J. C. Craig, Denver, Col.; E. F. DuBrul, Cincinnati; A. H. Bullard, Bridgeport, Conn., and A. B. Farquhar, York, Pa.—was adopted as follows:

WHEREAS, the strained relations between employer and employee are rapidly reducing the business conditions of the country to a state of chaos and anarchy, and the forces of socialism which are assuming control of the situation, regard neither law nor the rights and the liberties of individuals, and

WHEREAS, the Constitution of the United States provides that "Congress shall have power to regulate commerce with foreign nations and among the several states," and further provides that "no person shall be deprived of life, liberty or property without due process of law, nor shall private property be taken without just compensation," therefore be it

Resolved, that this convention demands that the officials, whether civic, state or national, enforce the law of the land and see to it that every man, woman and child seeking to earn an honest livelihood shall be protected therein by the whole force of the state or of the nation, if it be necessary.

Resolved, therefore, that in carrying on a firm and uncompromising contest with the abuses of unions as now constituted and conducted, at the same time acknowledging the free right of workmen to combine, and admitting that their combination when rightly constituted and conducted may prove highly useful, we earnestly desire to act, and believe we are acting in the true interests of the workingmen themselves. For our welfare is inseparable from theirs and theirs from ours; we are essentially interdependent, each is indispensably necessary to the other; and those who stir up strife between us are enemies of mankind.

Resolved, that the Citizens' Industrial Association of America is in earnest sympathy with every movement in the interest of labor. Believing that there can be no national prosperity where the working masses are ground down in hopeless poverty and ignorance, we hold as happiest of all the results of the great industrial revolution achieved in the last half century, the greatly advanced and improved condition of the working man at the present day.

D. M. Parry for President.

There had been much discussion outside the convention, of the proposal to make D. M. Parry of Indianapolis president. Mr. Parry's well known views were regarded in some quarters as a bar to his election, the ground being taken that his radical utterances might alienate from the movement the more conservative employers. But it was answered that as the keynote of Mr. Parry's position on the labor question as sounded in his latest published utterances was law enforcement, he became the logical head of the movement contemplated by the Citizens' Industrial Association of America. The nominating committee was a unit in presenting his name and his election by acclamation was attended by a striking outburst of an enthusiasm that seemed to run through the convention like prairie fire. In responding to the convention's call to assume the chair at once Mr. Parry said:

"Every pulse in my body responds to the movement in which we are enlisted. You may be sure that I can be reached by members of the association 365 days in the year and that I will always be ready to assist them in all ways."

The other officers elected are as follows:

First Vice President—J. C. Craig, Colorado Springs, Col., of the Colorado Springs Citizens' Alliance.

Second Vice President—E. M. McCleary, Detroit, of the National Electric Manufacturers' Association.

Third Vice President—J. T. Hoile, New York, of the Manufacturers' Association.

Treasurer—A. C. Rosencranz, Evansville, Ind., Citizens' Alliance.

The secretary is to be appointed by the executive committee. In addition to the above five there are to be ten members of the executive committee appointed by the president. Mr. Parry promises to make early announcement of these names.

In its closing hour on Friday afternoon, Oct. 30, the convention developed much enthusiasm over the more thorough understanding the delegates had reached as they became better acquainted. "America" was sung as the convention adjourned. President Parry gave to the press the following statement:

"The Citizens' Industrial Association of America is an attempt to crystallize into concrete expression the feeling of employers and business men as to the excesses of unionism. It must not be understood that this movement is for the purpose of oppressing the working people of the country. The federation established in Chicago today is purely defensive. I feel that all the employers of America have in this association a proper vehicle of organization which can defend them against the oppression of lawless trade unionism and stem the tide of socialistic and anarchistic dictation that has been sweeping over the country."

Bryan Robertson, Pittsburg, has accepted a position with the Field-Evans Iron Co. and has been placed in charge of its Pittsburg office. The company has taken over the office of J. K. Dimmick & Co., 801-2 Murtland Bldg., Pittsburg, together with the furnace agencies heretofore handled in Pittsburg territory by Messrs. Dimmick & Co.

The Duluth Furnace Co., Duluth, Minn., expects to have its retort coke ovens finished by Feb. 1. The company has contracts with the cities of Duluth and West Superior to take all the gas it can furnish.

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
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Developments in the machinery industry in this locality during October admit of both favorable and unfavorable comment. In the aggregate, there is good reason for stating that the situation was more satisfactory than for several months previous. Certainly the month closed with machinery men talking in a more hopeful strain concerning the outlook than they were a few weeks ago. Yet the fact remains that the continued dispostion to delay purchases is a discouraging feature; and while predictions are freely made that this state of affairs will not last long, each week that passes leaves very little to justify them. On all sides the financial situation is regarded as unfavorable to the machinery trade, for where orders are held up this is almost invariably assigned as the chief reason. While machinery merchants feel that much of this is simply "borrowing trouble," they frankly admit that their prospective customers do not look at it in the same way. Another reason for the holding up of orders is that buyers think better prices can be had by waiting. They are strengthened in this belief by the fall in the price of pig iron, and contend that this will be reflected in the price of machinery. Manufacturers assert that the price of raw material is an insignificant factor in the making of machinery, and that the cost of labor, in which there has been no reduction, is the controlling item. Others add that they are paying as much for castings nowadays as they ever did.

The machine tool trade generally showed improvement in the month of October. While there were no large propositions closed outside of the Canadian Pacific Railroad list, small orders were booked so frequently as to make the totals quite satisfactory. Machine tool men prefer this kind of trade, as they say better prices are obtained.

The number of orders held back, however, still continues large. Railroads are particularly well represented in this respect. For some time past the specifications for the machine tools which the Lehigh Valley will install at its new shops at Sayre, Pa., have been expected by the trade, but they have not been forthcoming. Recently the report went out that the shops would not be built, but this was found untrue. Several weeks ago Manning, Maxwell & Moore received the order for the crane equipment, but no definite information is obtainable as to when the machine tool specifications can be expected.

Prices of machine tools still hold pretty firm, although there are some houses which shade prices when a prospective order takes on a doubtful aspect. On large inquiries it is generally admitted that concessions are made all around. Several in this class are known to be fast shaping themselves for submission to the trade.

In engine and boiler trade circles, there is considerable complaint heard. The setback the building industry has recently suffered is beginning to manifest itself with emphasis in many branches of the machinery trade. Makers of engines and boilers have been particularly affected, and have come to the conclusion that trade prospects for them during the next few months are anything but encouraging. Orders from manufacturing sources are fairly active at best. Changed conditions are noticeable in the great improvement that has taken place in deliveries, in the frequency with which concessions are offered, and in the reductions of working forces that are being constantly made.

Makers of electrical machinery have had a fair month, but there are many houses not pleased with the business they have done. The adverse conditions in building have played havoc with the market for small electrical equipment, and prices are anything but firm. Many shops have practically reached the end of the orders they had booked for this class of work, and unless there is an influx of new contracts in the near future, many will be forced to reduce their working forces. Nearly every shop has orders for heavy equipment, which will keep it going for some time. Manufacturers take a hopeful view of the outlook, saying that labor difficulties in connection with new construction are fast disappearing. An enormous amount of machinery on old contracts awaits installation pending their settlement.

In power transmitting machinery, the month has been characterized by a fair volume of trade, with improvement expected. In machinists' supplies trade conditions are said to be fairly satisfactory, although much has been heard about easing prices.

The export machinery trade for the month has been without particular interest. The search for foreign business by American manufacturers has become keen, but resulting orders have not been up to expectations. German manufacturers continue to find no difficulty in underselling their American competitors.

The Niles-Bement-Pond Co. reports that October has been fairly satisfactory. There has not been any great amount of orders, but they were more numerous than during September. This company finds railroads unwilling to come into the market at present for machine tool purchases contemplated by them, the reason given being the uncertain financial situation. This firm does not look for any great machine tool activity before the new year. It expects that the crane situation will show some improvement in the near future. While it has no night gangs working, there has been no reduction in shop forces.

The Hay Foundry & Iron Works, engineers and contractors, at 145 Broadway, report business as quiet. Building construction involving several million dollars of iron and machinery orders has either been put off until next year or abandoned entirely, chiefly because of labor difficulties.

The Prentiss Tool & Supply Co., at 115 Liberty St., says that its October trade was the best it has done in months. It closed one contract for about $30,000 that had been hanging fire for five months. Inquiries come in freely, and culminate in orders better than recently. A good, steady business in machine tools is looked for during the winter.

The Payne Engineering Co., at 145 Broadway, reports business quiet. The company makes a specialty of small engines up to 200 horsepower for installation in new buildings, but trade from this source is practically at a standstill now. In some cases the company has closed contracts giving the right to the buyer to call for delivery at his pleasure. This company has bid on 50 percent less work in October than for the same month a year ago.

James Beggs & Co., manufacturers of machinery, tools, and supplies, at 109 Liberty St., find business dull, with a tendency to lower prices for machinists' supplies. They have enough orders booked to keep their shops going to their full capacity for some time.

The International Steam Pump Co., at 114 Liberty St., reports current trade to be good, with the possible exception of cases in which new construction is involved.

The probabilities are that the specifications for the machine tools for the new plant of Henry R. Worthington, at Harrison, N. J., will never be issued to the trade. The company has been gradually buying the tools, the Niles-Bement-Pond Co. getting practically all of the orders.

The Ingersoll-Sergeant Drill Co., 26 Cortlandt St., reports that its orders were more numerous in October than they have been for months, municipalities being particularly well represented in those received for air compressors. The pneumatic tool trade is growing. Shipments to European ports have been on a large scale during the past month.

The Crocker-Wheeler Co., of 39 Cortlandt St., found business much more satisfactory during the past month than it has been in several months. The foreign trade improved, especially that with Mexico.

Some time ago it was announced in *The Iron Trade Review* that the Loomis-Pettibone Co. had postponed the erection of its proposed new plant at Linden, N. J., for which it intended purchasing about $600,000 worth of machinery. It is now stated officially that the company has decided not to build at all. It finds that it can get along with the Holthoff Machinery Co.'s plant at Cudahy, Wis., which it acquired several months ago.

The opinion is pretty strong in machinery circles here that collections during the past month have been the slowest this year. Machinery men are unable to account for the fact.

The Labor Situation.

MACHINISTS ADVISED THAT TIMES HAVE CHANGED.

The following circular has been issued by President James O'Connell, of the International Association of Machinists:

Dear Sirs and Brothers—Owing to the general falling off of trade throughout our entire jurisdiction, I desire to again call your attention to the necessity of exercising the greatest care in the handling of the affairs of our association, in order that our members may not, without sufficient cause or greatest provocation, involve themselves in strikes without first having secured permission to do so from the general executive board, as is provided for in our constitution, article six.

During the past few weeks an understanding has been reached by the general officers of many railroads whereby a general reduction in the mechanical departments has been ordered, and already large decreases in the forces have taken place.

Retrenchment orders are being sent out to all of the large combinations, and the mechanical forces are to be reduced wherever possible to the lowest possible limit.

Private employers are reducing the forces wherever possible, and as a whole, the situation is anything but bright.

I deem it my duty to call your attention to this state of affairs, realizing that our membership at large is not in as close touch with the general situation as I am at headquarters.

I am not a calamity howler, nor am I sending out this information with a view to in any way discourage our members to secure improved conditions of employment wherever possible, but the purpose of this information is to guard our membership at large against ill-advised information which would bring about strikes or disagreements with our employers.

A very great effort should be made to strengthen our ranks wherever possible, and above all, to maintain the present organization, in order that we may be in a position to maintain the conditions of employment we have already secured, and to prevent any attempt on the part of our employers to take from us the shorter workday which we have so successfully battled for, and further, to prevent any attempt on the part of the employers to reduce the wages.

I desire once more to call your attention to the decision reached by the G. E. B., in which our members at large were warned, that members involving themselves in a strike of any kind without having first secured the sanction of the board, would not be entitled to benefits, as provided for in our general laws.

If you have grievances or demands of any kind to present to your employers they should first be submitted to me for consideration of myself and the G. E. B., in order that we may be in a position to give you full advice and instructions.

There are a large number of men engaged in detective capacity circulated among our membership throughout the country, and these men are engaged for no other purpose than to cause trouble. If they cannot succeed one way, they will, of course, try another method, and unquestionably one of their practices would be to stir up trouble and induce men to make foolish demands, and succeed in involving them in strikes which might result disastrously. You are, therefore, warned to be exceptionally careful and not heed the advice of men whom you may not be thoroughly acquainted with.

Trusting you will give these suggestions your most careful consideration, and advise all whom you may come in contact with to act in accordance with these instructions, with best wishes, I am yours fraternally, JAMES O'CONNELL.

MACHINISTS' UNION AND THE N. M. T. A.

In our last issue reference was made to the letter recently sent by President O'Connell, of the International Association of Machinists, to the National Metal Trades Association, proposing a conference. The substance of the reply was also given. As a matter of record, we present the full correspondence below:

CHICAGO, Oct. 17, 1903.

Administrative Council, National Metal Trades Association.

Gentlemen: I learn that you are to hold an executive meeting Monday, the 19th, and I take this opportunity of addressing you with the view to the appointment of a committee for the purpose of conferring with a committee from the International Association of Machinists, to ascertain if it is not possible for the two associations to bring about an agreement.

It is true that we have disagreed, but in my opinion it would be well to close the curtain on the past and open it up again on a new program that may bring us together on a working basis. I have every reason to believe that if a friendly spirit is exhibited on the part of both, pleasant and harmonious relations can again be brought about.

With this end in view I would be very pleased if a special committee would be appointed by your honorable body to meet a similar committee of the machinists at an early date to be mutually agreed upon. These committees could meet without being bound in any way but to report back to the two organizations any plans or suggestions for consideration of the two organizations, my idea being that the first meeting would be of a preliminary and advisory character. I should be very pleased to have an early and favorable reply, and in advance, beg to assure you of my desire to co-operate in any movement that will tend to bring the two organizations more closely together. Very truly yours,

JAMES O'CONNELL,
President International Association of Machinists.
Address, McGill Building, Washington, D. C.

CINCINNATI, Oct. 22, 1903.

Mr. Jas. O'Connell,
Pres., International Association of Machinists,
McGill Bldg., Washington, D. C.

Dear Sir: I beg to acknowledge receipt of your courteous favor, dated Chicago, Oct. 17, 1903, addressed to the Administrative Council of the National Metal Trades Association. The same has had our careful consideration.

I am directed by that body to inform you that in view of the position promulgated by your association at its last general convention, against the open shop and the right of the individual to work where he pleases; against the freedom of every American boy to learn a trade by arbitrarily limiting the number of apprentices; against just methods of increasing production and freedom of shop management, the meeting you propose is considered inadvisable.

When the fundamental principles of our two associations are nearer in accord, we trust that a common path may be found that will lead toward continued harmony.

Yours truly,
E. F. DUBRUL,
Commissioner.

LABOR BUREAU FOR NEW ENGLAND SHOPS AND FOUNDRIES.

In the fall of 1902 it was proposed by the New England Foundrymen's Association that a credit labor bureau be founded in Boston to cover the New England foundries. Action at that time was postponed as it was learned that other metal associations were also working along the same lines, and that associations with them was both possible and desirable. Working with this object in view, a joint committee has been formed consisting of two members from each of the associations interested—New England Iron League, Boston Metal Trades Association, and New England Foundrymen's Association. This committee is at present engaged in active formulation of the bureau, the purposes of which are stated to be: To keep a correct live list of all active employees in the trades represented by the membership of the three societies concerned (molders, pattern makers, machinists, blacksmiths, plate workers, etc., etc.), open at all times to the subscribers to the bureau. This list to contain full information in regard to every workman so far as it is proper to do so. To enable workmen out of employment to come in touch with employers wishing men, and to enable employers to easily find what men are in need of work.

A NATIONAL ASSOCIATION OF BUILDING CONTRACTORS.

The building contractors of the country are to meet in Chicago, Dec. 10, with a view to forming a national association for the purpose of combating the unjust demands of labor organizations whose members are employed in the construction of buildings. The Building Contractors' Council of Chicago originated the movement and formally called the first meeting. It is hoped that by securing a national agreement with trades unions, the building industry all over the country will be revived and contractors will be able to undertake work without fear of half a dozen strikes before the job is finished. The Chicago contractors outline the policy of the new association as follows: To maintain peace between the employers and employes. That the basis of the settlement of all disputes should be conciliation and arbitration. That the sympathetic strike should be absolutely prohibited.

To hold the trade unions in check the contractors intend to incorporate in their agreements the following: No restriction of the use of machinery or tools. That the use of apprentices shall not be prohibited. That all workingmen are at liberty to work for whomsoever they see fit. That all employers are at liberty to employ and discharge whomsoever they see fit.

The movement has been indorsed by the labor leaders of the building industry.

LABOR NOTES.

A national strike of structural ironworkers was ordered

last week by the International Association of Bridge and Structural Ironworkers against the members of the Iron League to compel the league and the Employers' Association to recognize that New York union of which Sam Parks has been the dominant spirit. President Buchanan, of the International Association, was strongly opposed to the declaration of the strike, and before it became effective succeeded in having the action reconsidered. There is now some prospect that an amicable adjustment of pending controversies will be secured.

Of the Illinois Steel Works employes at South Chicago, who were recently laid off, 1,200 have been offered employment as laborers at $1.60 a day, pending the resumption of work in the mills. Nearly all have accepted the offer.

As a result of the discharge of 10 percent of the employes in the Erie shops in Susquehanna, Pa., the remaining boilermakers have gone on a strike, alleging that these discharges were in violation of an agreement.

Sam Parks, the notorious walking delegate of the Housesmiths' Union, New York, has again been convicted of extortion. The case was that in which he was accused of demanding and receiving $500 from the Tiffany Studios.

The striking metal workers at the H. B. Smith foundry, Westfield, Mass., have given up their fight. The men go back without any advantage gained, and a number of them will not be able to obtain their former jobs.

The Indianapolis Foundry Co. has always been operated as an open shop. The men were well paid, but of the 154 molders about 125 were union men and a few weeks ago decided that they would not work with non-union molders. They appealed to the company to employ only union men, but the petition was refused and a few days ago they went out on a strike.

The strike of the boilermakers at the Heilman Boiler Works, Allentown, Pa., has been declared off and the men have returned to work after an idleness of six weeks. The strike affected several hundred workmen.

Newspaper reports state that the Manitowoc Dry Dock Co., Manitowoc, Wis., which for some time has maintained a shipyard at Chicago, has disposed of its plant in that city because of labor troubles and concentrated its entire works at Manitowoc, Wis.

In spite of the injunction against the strikers at the Lane & Bodley Foundry, Cincinnati, it is reported that three or four of the workmen have been beaten.

Obituary.

Mrs. Louise C. Bartlett, president of the firm of A. F. Bartlett & Co., Saginaw, Mich., machinists, founders and galvanizers, having one of the largest industries in Saginaw, died Oct. 26, aged 60 years. Mrs. Bartlett was also actively interested in a number of other industries and was perhaps the most prominent business woman of the State.

Clinton Burnham, president of the Clinton Burnham Foundry Co., Milwaukee, died Oct. 28, aged 43 years. He was founder of the company.

The *Journal* of the American Foundrymen's Association is to be issued hereafter as a quarterly and the first issue under the new plan is in magazine form, attractive in matter and make-up. The secretary, Dr. Richard Moldenke, has secured the assistance of a number of well known writers on foundry subjects, who will have charge of various departments, giving in each number of the *Journal* considerable original matter, and making the publication of great value to foundrymen.

Young, Eberhard & Martin, Cleveland, have submitted to the city of Norwalk, O., a proposition to establish a plant for the manufacture of malleable iron castings. They ask for 40 acres of land and $100,000 in cash, and propose to erect two large buildings and employ 700 men. The Eberhard Mfg. Co., of Cleveland, is not connected with the enterprise.

B. B. Potter, president of the North Star Iron Works, Griffith, Ind., has purchased a site at Hammond, Ind., on which will be erected a foundry and machine shop.

The furnace of the Spring Valley Iron & Ore Co., Spring Valley, Wis., has been blown out for an indefinite time.

PERSONAL.

Rear Admiral Francis Tiffany Bowles, chief constructor of the navy, has resigned his commission in the service of the United States, and Naval Constructor Washington Lee Capps has been appointed to succeed him. Admiral Bowles' resignation was effective on Nov. 1. He has accepted the presidency of the Fore River Ship & Engine Building Co., of Quincy, Mass. President Thomas A. Watson, of that company, in an interview, said: "As the president and largest stockholder of the company, it has been my desire for a long time to secure the services of Rear Admiral Bowles in connection with our work of shipbuilding, as he is undoubtedly the man best fitted, both by education and practical experience, to take charge of our complicated and difficult work. Not being a naval constructor myself, I have held my position as president of the company until Admiral Bowels could be induced to accept the presidency of my company. His taking the position marks another step of the utmost importance to the development of the shipbuilding industry of New England, and the Admiral enters upon his work under the most happy auspices. I shall retain my connection with and interest in the company as chairman of the board of directors."

Geo. G. Blackwell, chairman of Geo. G. Blackwell Sons & Co., Ltd., of Liverpool, Eng., will be at the Hotel Schenley, Pittsburg, for the next 10 days.

Frank G. Bolles, assistant sales manager of the Bullock Electric Mfg. Co., Cincinnati, has resigned to become business manager of the Cassier's Publishing Co., New York.

Charles Fell, for some time superintendent of the lap weld department of the National Tube Works, McKeesport, Pa., has been appointed superintendent of the new tube mills now being constructed at Lorain, Ohio. A. Duncan has been appointed to succeed Mr. Fell at McKeesport.

Andrew Carnegie arrived in New York Oct. 29.

L. M. Henoch, manager of sales for Joseph T. Ryerson & Son, Chicago, will sail this week from New York on an extended ocean voyage for a much needed rest.

J. J. Shannon, who is now with the Alabama Steel & Wire Co., managing the construction of its blast furnace at Gadsden, will become general superintendent of the furnaces of the Sloss-Sheffield Steel & Iron Co.

R. W. Ney, who has been assistant to Manager A. T. De Forest of the Cleveland district of the American Steel & Wire Co., has been placed in charge of the wire department and will hereafter report to C. L. Miller, general superintendent. His duties will be similar to those which he has had. Max McMurray, superintendent of steel works and blast furnaces in the Cleveland and Pittsburg district, will also report to Mr. Miller.

J. Kirk Crooks, of Robert Crooks, Liverpool, Eng., is now in the United States, investigating the possibilities of export trade in Southern pig iron, to be handled by his firm.

The American Boiler Appliance Co., Chicago, capital $10,000, has been incorporated to manufacture boiler devices.

The Lion Iron Works, 3293 Third Ave., New York City, has made an assignment.

One hundred coke ovens of the Lookout Mountain Iron Co., at Battelle, Ala., were lighted a few days ago. It is the intention of the company to provide a good supply of coke before the furnace plant is started, which will be about March 1.

To Seattle, Wash., belongs the credit of being the first place in the United States where tin ore has been smelted. Ore taken from a deposit in Alaska was smelted in the assay rooms of Joseph Mayer & Co., a few days ago. About 15 tons of this Alaskan ore will be smelted.

The royal commission of six protectionists and six free traders, lately appointed to consider a proposal to establish iron works in Australia by the aid of State bonuses, is evenly divided regarding the practicability or advisability of the scheme, the free traders being opposed to the bonus plan and the protectionists in favor of it.

The New Foundry and Pattern Departments of the B. F. Sturtevant Co., at Hyde Park, Mass.

For several years the B. F. Sturtevant Co. has felt the excessive pressure of increased business and the necessity for much more extended facilities for manufacturing than were possessed by the old plant at Jamaica Plain, Mass. The fire which visited this plant in 1901 had the effect of definitely settling the question of removal and plans were immediately begun for a thoroughly modern manufactory at Hyde Park, about nine miles from Boston, where an abundance of skilled labor is always available.

The site selected was admirably adapted for the requirements; the tract of land contains over 15 acres and has a frontage of 1,300 feet along the freight yard tracks of the New York, New Haven & Hartford railroad, near its station at Readville. The water supply is ample and the space for dumping waste is sufficient to meet all requirements for years to come.

The general layout of the plant is shown in Fig. 1 and comprises a commodious four-story office building, measuring 45 by 125 feet, a three-story building, 80 by 500 feet, devoted to the manufacture of blowers, heaters and galvanized iron work; a building, 80 by 240 feet, of the same height, on the first floor of which all engines will be tested, stored and shipped, while the other floors will be utilized by the electrical department; a general machine shop, measuring 120 by 500 feet, with 40-foot side galleries, devoted principally to the building of engines; a forge shop, 40 by 100 feet; a two-story building of the same floor area devoted exclusively to lockers, washing and sanitary facilities for the employes; a pattern and storage building 80 by 150 feet in ground plan; a foundry measuring 170 by 350 feet; a power house 80 feet square with detached fire and service pump building. All told, the aggregate floor area of the buildings exceeds nine acres. Brick has been used for all walls; steel columns and girders form part of the construction of such buildings as are equipped with traveling cranes; all upper floors are of plank with top course of maple laid on heavy wooden beams and designed in the case of the principal buildings for carrying safe loads of 200 to 250 pounds per square foot. The roofs are of heavy plank, covered with tar and gravel.

The arrangement of the buildings is the result of the most careful study and endeavor to simplify to the limit the matter of inter-transportation. Numerous spur tracks permit of ready handling of in-coming and out-going freight, while a complete system of industrial railways connects all departments. The industrial system is equipped with 12-pound T rails, laid 24 inches gauge on centers, with turntables, tracks cars, etc., all of which were specially designed and made by the Sturtevant Co.

Before the completion of the new power house, a temporary plant was established in the foundry building. This comprises a locomotive boiler, draft for which is produced by a Sturtevant induced draft fan and two 75-kilowatt generators driven by two Sturtevant 13x12 horizontal engines, which furnish direct current at 220 volts. This is utilized both for power and for arc and incandescent lighting throughout the plant. The entire transmission equipment, including motors and hangers, is of Sturtevant manufacture.

The foundry and pattern departments which form the subject of this description were the first to be put in operation prior to the removal of the entire plant from Jamaica Plain.

The Pattern Building.

The pattern building is divided midway of its length by fire walls enclosing stairs, elevators, etc. One-half the building, with stories respectively 17 and 15 feet, is devoted to the flask and pattern making rooms, while the other half, provided with intermediate floors, making four in all, is utilized for pattern storage.

The flask-shop, measuring about 60 by 80 feet, is illustrated in Fig 2 and is equipped with band, cross cut and splitting

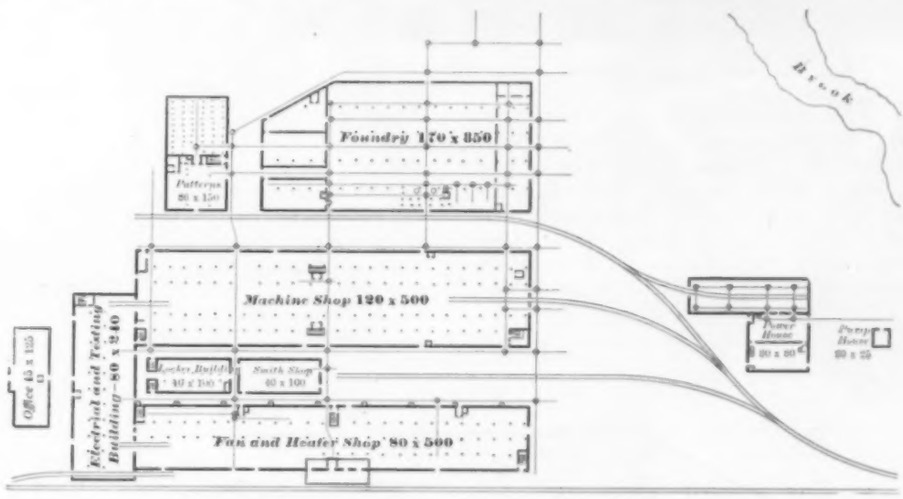


FIG. 1.—PLAN OF THE B. F. STURTEVANT CO.'S WORKS, HYDE PARK, MASS.

saws, boring machine and lathe, all driven by a 10-horsepower Sturtevant motor suspended from the ceiling. The industrial railway runs directly into this room from the foundry across a distance of about 40 feet and, together with an overhead transfer track, reduces the cost of handling flasks to a minimum. The lumber for flask manufacture is unloaded from cars directly in front of the building. This room also includes the metal pattern makers' department equipped with the necessary machine tools. Adjacent thereto is the locker, wash and toilet room for the building.

Immediately above is the pattern shop, abundantly lighted upon three sides and equipped with a full complement of tools, including one single and two double saw benches, two band saws, a buzz planer and a double surfacer, five lathes, one of which is a 66-inch by 11½-foot gap lathe, a drill press, a core box machine, numerous wood trimmers, etc. The power machines are operated by two 10-horsepower Sturtevant motors, both being employed for ordinary work, but each is of such capacity that either may serve as a possible relay in case of accident or overload.

The benches which accommodate two men each and measure 2 feet 6 inches in width by 16 feet in length are so arranged along the sides of the building that the men all receive a left-shoulder light. Behind each bench is a working table 4 by 16 feet. The benches are supported upon cast iron legs of special design which were built by the Sturtevant Co. and are used

throughout the plant. They are equipped with Emmert vises and their tops are of heavy maple plank. A warming chamber for glued work is provided which receives warm air through the main flue from a Sturtevant heating apparatus below.

Around the pipe columns which support the floors of the pattern storage end of the building are clamped the pattern shelving brackets which are adjustable to any height. All patterns are consecutively numbered upon the drawings as made. When delivered to the pattern storage department proper locations are assigned, and records thereof made upon cards, one

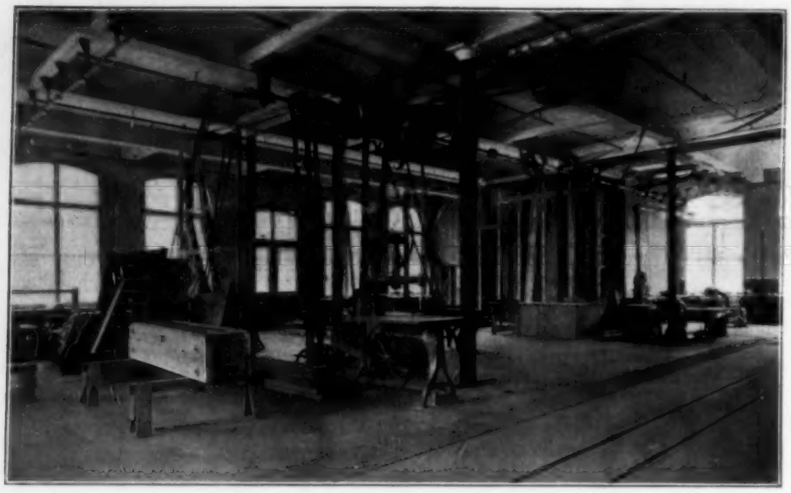


FIG. 2.—FLASK ROOM.

for each pattern. These cards are filed in the order of the pattern numbers. Four figures with the addition of a letter are in every case sufficient to locate a pattern. A given location, for instance, may be 2125B; that is, it is upon the second floor, as shown by the first numeral, "2." It is in the twelfth row of shelves and the fifth division of that row as shown by the succeeding numerals "125," and on the "B" level; the floor being designated A, and the letters B, C, D, etc., indicating the shelves in their order above.

The first floor is of concrete and is designed for the keeping of heavy cast iron patterns. It is served by an industrial railway and turntable which permits of transfer to the elevator and thence to other floors. Communication between the pattern shop and storage department is direct, while the fire risk is reduced to a minimum by a double system of fire doors.

The molder's written order to make a specified number of castings is issued by the foundry office, directly to the pattern keeper, who makes record thereon of the pattern location, attaches it to the pattern and sends both to the foundry. A metal clip placed upon the storage record card indicates that the pattern is out.

The Foundry.

The general plan of the foundry is shown in Fig. 3. It consists essentially of two long craneways each 35 feet in width with a center bent of the same width, and side floors 30 feet wide. The brass foundry, core room and wash room are located at one end; the charging floor at the side, nearly midway of the length, and the cleaning room at the other end. The craneways are designed for 20-ton electric traveling cranes. Those already installed are of the Whiting Foundry Equipment Co.'s make and are equipped with Sturtevant motors. Fig. 4 shows an exterior and three interior views of the foundry.

Brick division walls three and one-half feet high running lengthwise of the foundry separate the floors on the lines of the columns. Lighting is secured through monitors in both of the craneways and through ample side windows. Each line of monitor transoms is operated in unison by a novel device installed by the G. Drouve Co. The western side of the foundry is given up to bench and small floor molding, the bench molder's floors being separated at the bench ends by wooden partitions. The floors throughout this side of the building, as well as those in the storage bins and center runways, are of concrete. Alongside the industrial railway, which serves iron from ladle trucks to the bench floors, is a sunken trench laid with common brick as a suitable place for drippings and for the piling of hot castings.

In the center line of each of the craneways and in the bent between them runs an industrial railway with turntables connecting with the cross aisles, which provides for the distribution of metal, etc., to all parts of the building. The floor between the craneways is supplied with a series of 1½-ton small traveling cranes of about 10-foot span, equipped with Sturtevant electric hoists built especially for this work.

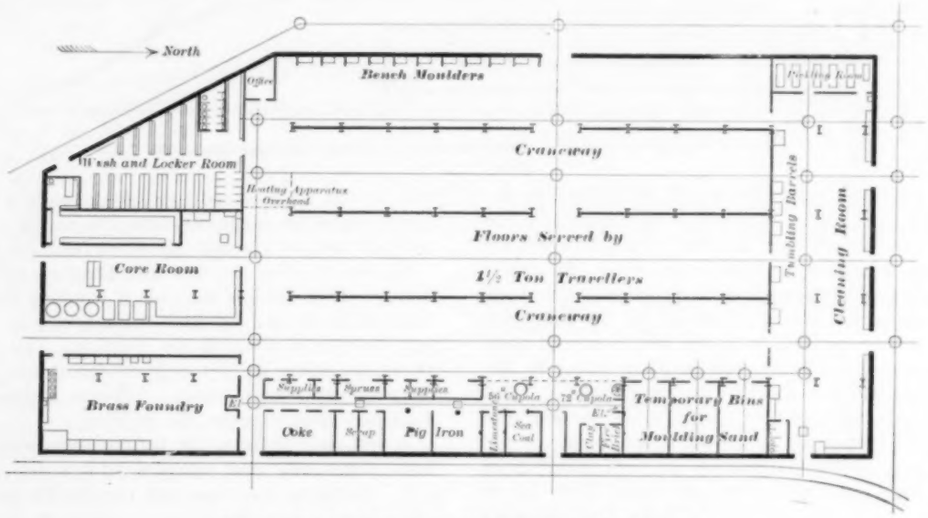


FIG. 3.—PLAN OF THE B. F. STURTEVANT CO.'S FOUNDRY.

All materials are received from a track which runs along one side of the foundry and are delivered through wall openings to the bins which fill a portion of the side wing adjacent to the cupolas. For the present the sand storage bins and mixing room are also within this building.

Charging System.

An ingenious system of charging, illustrated in Fig. 5, has been devised under which the charging cars pass at floor level in front of the bins, are there loaded with the requisite amounts, weighed, and passed to the elevator where they are

raised to the charging floor. As each car is unloaded it is pushed forward and started down an incline whence it passes back in a direction opposite to that traversed while being loaded on the floor beneath. A novel apparatus gradually brings it to a standstill while yet upon the incline, and then releases it so that it may, by its own weight, roll on to an elevator which is automatically tripped and descends to the ground floor level. Here it is removed by one of the loading men and the elevator returns to its place above ready to receive another car.

The Cupolas.

The cupolas are two in number of Whiting make 54 inches and 72 inches in diameter. The opportunity has been improved to show the eminent adaptability of the Sturtevant blower; a No. 8 and a No. 10 blower driven respectively by a 30 and a 40-horsepower Sturtevant belted motor being supported upon the charging platform through which they discharge directly downward and thence to the cupolas. It is intended to make this installation the subject of critical experiment for the establishment of important principles.

Transportation Equipment.

The entire transportation equipment of the plant, including tracks, cars, trucks, etc., was designed and built by the Sturtevant Co. The tracks in the foundry are imbedded in the concrete runways and all changes of direction are secured by turntables, there being no switches in the works, and therefore no radial truck cars, all cars having rigid bases.

The turntables and cars are shown in Fig. 6. The turntables are of very heavy design to avoid distortion or breakage and consist of a bottom frame with four roller wheels which are carried upon composition trunnions, and a cover. The cover is recessed for tracks crossing at right angles and provided on the underside with a chilled tread with which the wheels come in contact. A small idler wheel is provided which automatically stops the turntable on each quarter but readily releases it. The cover is accurately centered by a chilled conical bearing.

The cars are provided with a special type of ball-bearing, practically devoid of machine work, but with chilled wearing surfaces. The ordinary flat cars as well as the charging cars are built up of structural steel. The geared ladle cars have malleable iron frames and enclosed spur gear mechanism. Similar construction is employed in the case of the transfer cars for geared crane ladles of medium size, while a simple low platform truck is utilized in the case of the largest crane ladles. The dump cars are in the form of inverted cones and so balanced as to be tipped with the utmost ease. The taper of the cone is such that these cars are practically self-dumping.

Brass Foundry.

The brass foundry, Fig. 7, is located at one corner of the main building. It is provided with four crucible furnaces and a special form of reverberatory furnace designed principally for the melting of babbitt or similar soft metals. An overhead traveler with interlocking transfers on the side floors serves the entire area of the room. Blast for the furnaces is furnished by a No. 3 Sturtevant monogram blower and the entire machinery consisting, in addition, of a sprue cutter, a magnetic separator, a tumbling barrel and emery wheels, is driven by a 5-horsepower Sturtevant motor attached to the wall. The entire floor is of concrete in which is imbedded a section of the industrial railway communicating with the balance of the foundry.

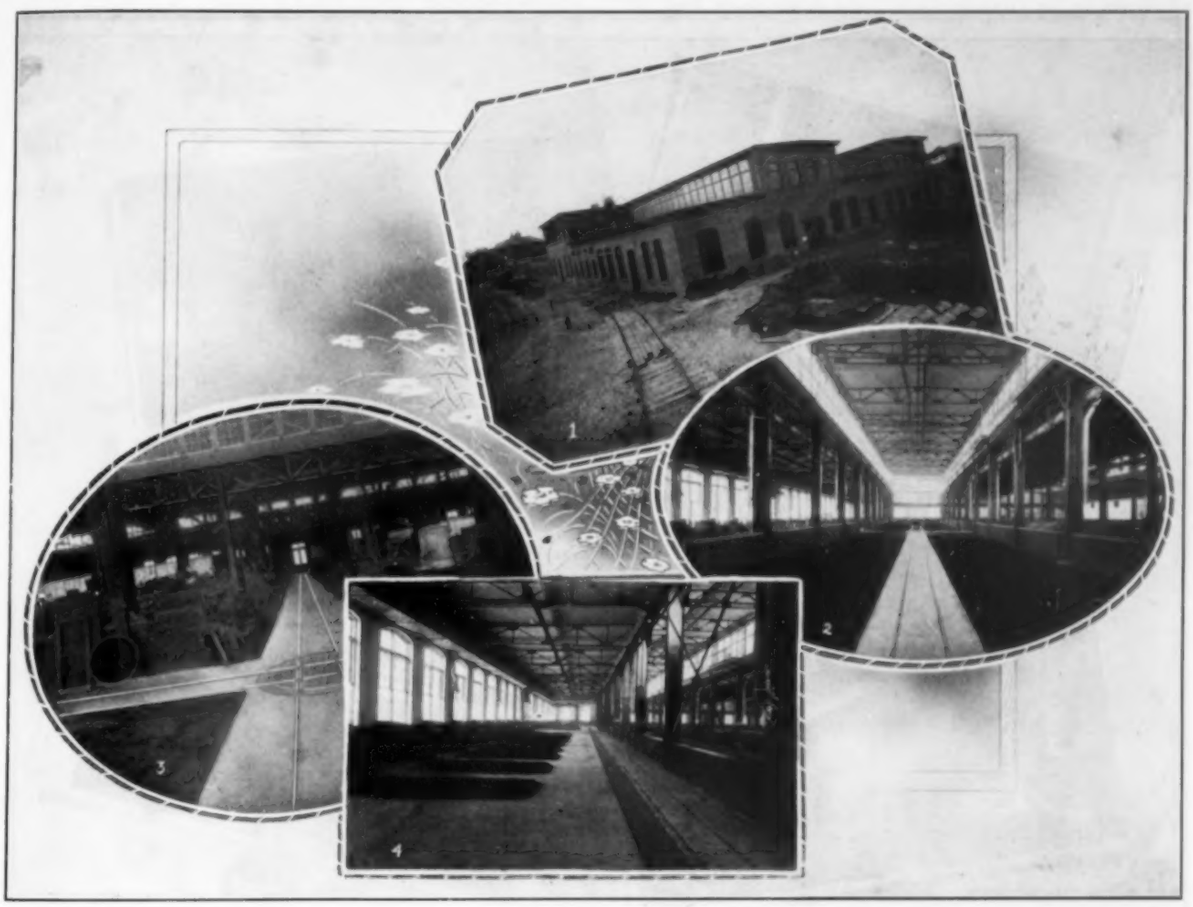


FIG. 4.—1. FOUNDRY AND PATTERN BUILDING. 2 WEST CRANE-WAY, LOOKING NORTH. 3. FOUNDRY INTERIOR, LOOKING EAST, FACING CUPOLAS. 4. WEST SIDE OF FOUNDRY, LOOKING NORTH.

Core Room.

In the middle of the end of the foundry is the core room. The ovens are six in number, three being 7 feet in diameter, of the reel type and three being respectively 4, 5 and 7 feet in width by 8 feet 10 inches in length provided with cars. The core ovens are shown in Fig. 8 and the core racks and reels in Fig. 7. An overhead traveling crane serves these latter ovens and provides for the transfer of heavy cores to the industrial railway which passes through this room. A portion of the room is partitioned off and serves for the women core makers employed in this department. The floor is of concrete. The tops of the ovens are utilized for storage of cores

upon a special rack of steel construction. A Blake wire straightener and a Hanna automatic shaker are the principle machines in this room.

Cleaning Room.

At the other end of the foundry is the cleaning room, Fig. 10, through which run the longitudinal tracks from each main aisle of the foundry. A 5-ton, 3-motor electric crane of the Whiting Foundry Equipment Co.'s manufacture, equipped with Sturtevant motors, serves the greater portion of the floor in this room. The tumbling barrels, six in number, are completely enclosed in housings of steel construction. These, together with a Sly cinder mill and several emery wheels, are driven by a 30-horsepower Sturtevant motor. A temporary air compressor located in one corner and driven by a Sturtevant motor, supplies air at 100 pounds pressure to chippers, stokers, hoists, etc., employed in connection with this work. The light and ventilation of this room are noticeably good.

Pickle Room.

Adjacent to the cleaning room is the pickle room, Figs. 11 and 12, the floors of both being of concrete. The pickle beds are of teeter board construction so designed that the acid may be drained back into the vats and the board subsequently teetered over for washing into the trench upon the other side of the room. The floor slopes so as to give perfect drainage. A pneumatic traveling crane serves this room.

Sanitary Arrangements.

One of the notable features of the equipment of this plant is to be found in the sanitary arrangements. Generous provision has been made in the case of the foundry, which has a large locker and wash room as seen in Fig. 13. Expanded metal lockers to the number of 225 are already in position. Enameled iron sinks, six in number, are served with tempered water and a series of slate partitioned shower baths has proved to be very acceptable during the past summer. The floor of this room is of tar concrete; the upper walls and ceilings, which are white and fresh, are in pleasing contrast with the steel work and base of the walls which are finished in rich dark green. Within the same room is installed the time recording system so placed that a double line of men pass, one upon either side, of the board as they go and come from the room. The foundry foreman has not been forgotten in the matter of convenience and he, with his assistants, is provided with an attractive office, well lighted and susceptible of thorough ventilation from out of doors.

Naturally, the entire plant is heated and ventilated by the Sturtevant system. In the case of the pattern building, the apparatus consisting of an engine-driven fan and steel pipe heater is placed close to the division wall and delivers the heated air into a vertical flue and thence to the various rooms. The foundry apparatus is located overhead in the end of one of the craneways and arranged to take fresh air from out of doors or on return from the building and reheat it. Distribution of air is made through a system of overhead galvanized iron piping, discharging downward to the floor. Both sets of apparatus utilize exhaust steam. A complete underground tunnel system is provided for distribution of steam, electricity, compressed air, etc., and return of condensation.

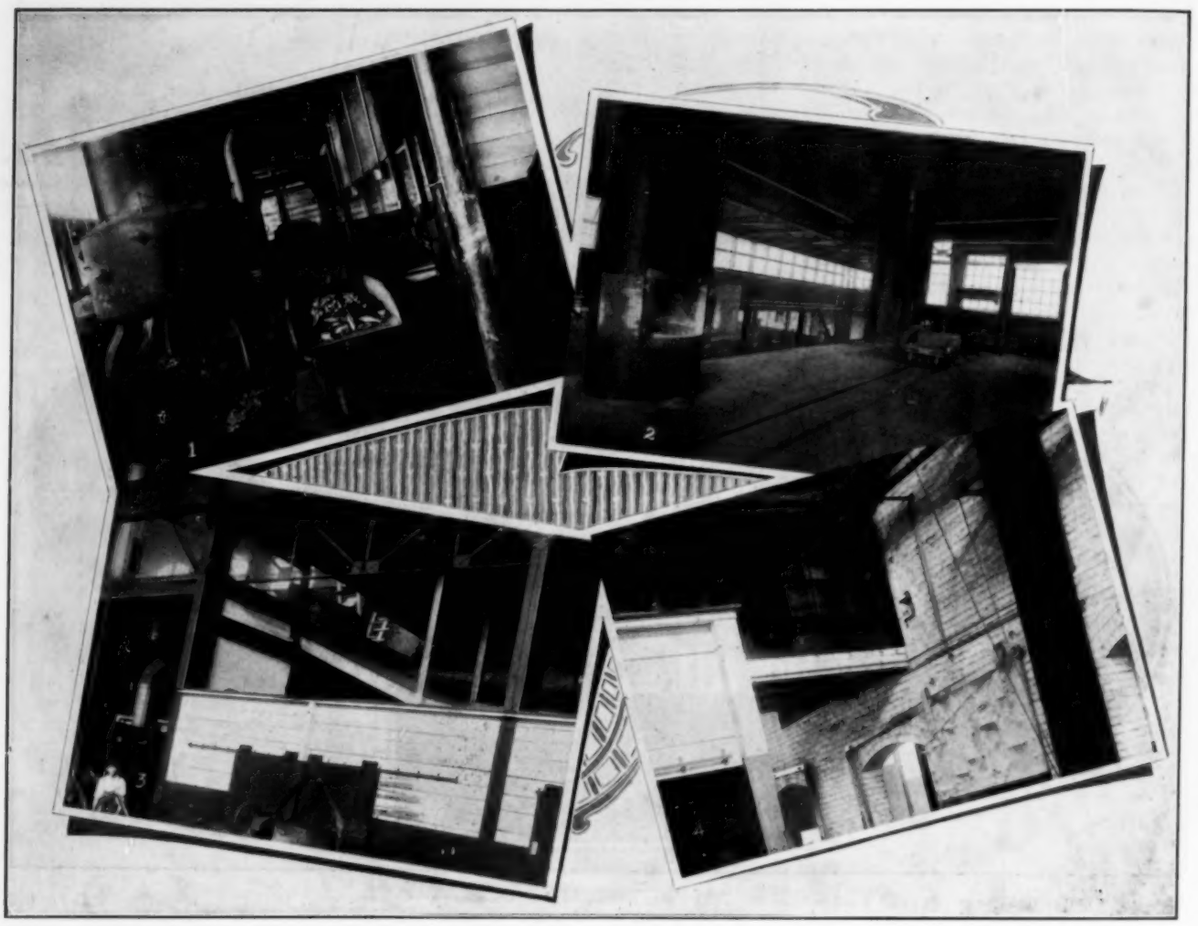


FIG. 5.—1. CHARGING CARS IN FRONT OF BINS. 2. CHARGING CARS ON CHARGING FLOOR. 3. CHARGING CAR ENTERING CHUTE. 4. CHARGING CAR ENTERING DROP ELEVATOR.

The Trussed Concrete Steel Co., Detroit, Mich., recently incorporated, was formed to erect re-enforced concrete work in accordance with the Kahn system. The company takes a single rolled bar and shears up therefrom members so as to make of it a half truss. This, when imbedded within the concrete, supplies the vertical as well as the horizontal tensional re-enforcement. It is the intention to sell these bars to parties wishing to do concrete work. The company also has a patented trussed lintel construction.

The New Albany Trust Co., assignee for the New Albany Stove & Foundry Co., New Albany, Ind., has filed its final report. The creditors will receive about 15 percent of their claims.

A Model Shop.

BY L. G. STEBBINS.

The writer thoroughly realizes that he has a pretty large subject to discuss, and one on which there will be a great many different opinions resulting in much criticism, some of it favorable, perhaps more adverse, but the matter is discussed in this paper from the standpoint of practical application, and, while it may be freely criticised, the writer thinks that it cannot be justly branded as impractical or irrational.

The first element, the basic fundamental principle in a model shops, is to have the workmen contented with their surroundings and in love with their work. To produce these results is the first business on hand, the initial step in the effort towards the establishing of a model shop. There is a world of truth in the old saw, "Man needs but little here below," and in no case is it truer than in the condition of the average workman. A fair, living wage, a warm place to work in during the cold months of the year, and the average man is, in a way, contented. But some contend that for one to be satisfied with his present situation is an unfavorable sign, indicating lack of ambition and consequent diminution of energy and care in the performance of his work. Nevertheless, a satisfied man is a good asset for any employer to have, but in order to increase the efficiency of the man and thus secure the full value of his satisfaction, it is necessary that something be done to impart something to the man that will act like ambition, and yet allow the man to be satisfied. By the term, or rather the word, "satisfied," I do not necessarily mean the man's present situation, but rather his attitude toward his employer. This is the keynote to the whole situation; make it your ambition to have a shop filled with men who are convinced that there is no better man to work for than their present employer. When you have a force of men who believe this you have accomplished a great thing, and your business success is secured, all other things being equal. The workingman, as well as any other man, is an unknown quantity along many lines of thought and action, but the average man will work better and harder for an employer whom he likes than he will for one whom he does not like.

As I have said above, the average workman needs but little. If he gets but little he will not be hunting up a reason why he should strike, nor will he be striving to get the best results out of the machine he may be running. He will be simply a negative. But take the same man, and let him see that you are interested in his welfare, give him more than he absolutely requires, and you will find a great change in the man in a little while. It is my purpose to briefly suggest ways and means to instill something like ambition in the hearts of the men we are discussing.

In the first place he should have a clean, wholesome shop to work in. Dirt and dust are demoralizing anywhere, and there is no doubt whatever that a clean, light shop pays for the time spent in this work several times during one year. Keep the windows clean so that the bright sunshine may flood the room on the cold winter days. There is really no reason why the shop windows should not be kept as clean as those in the office. Ponder this and answer the question in your own mind. Clean windows add to the good appearance of a shop and increase the standing of that shop in the eyes of the people who pass it daily.

Again, the matter of ventilation is claiming attention these days as it never did before, and very fine ventilating plants may be installed at not unreasonable prices. Good ventilation is necessary to the health of a workman as well as anybody else, and a healthy workman can turn out more and better work than a weakling.

Fresh air and good light are the free and God-given rights

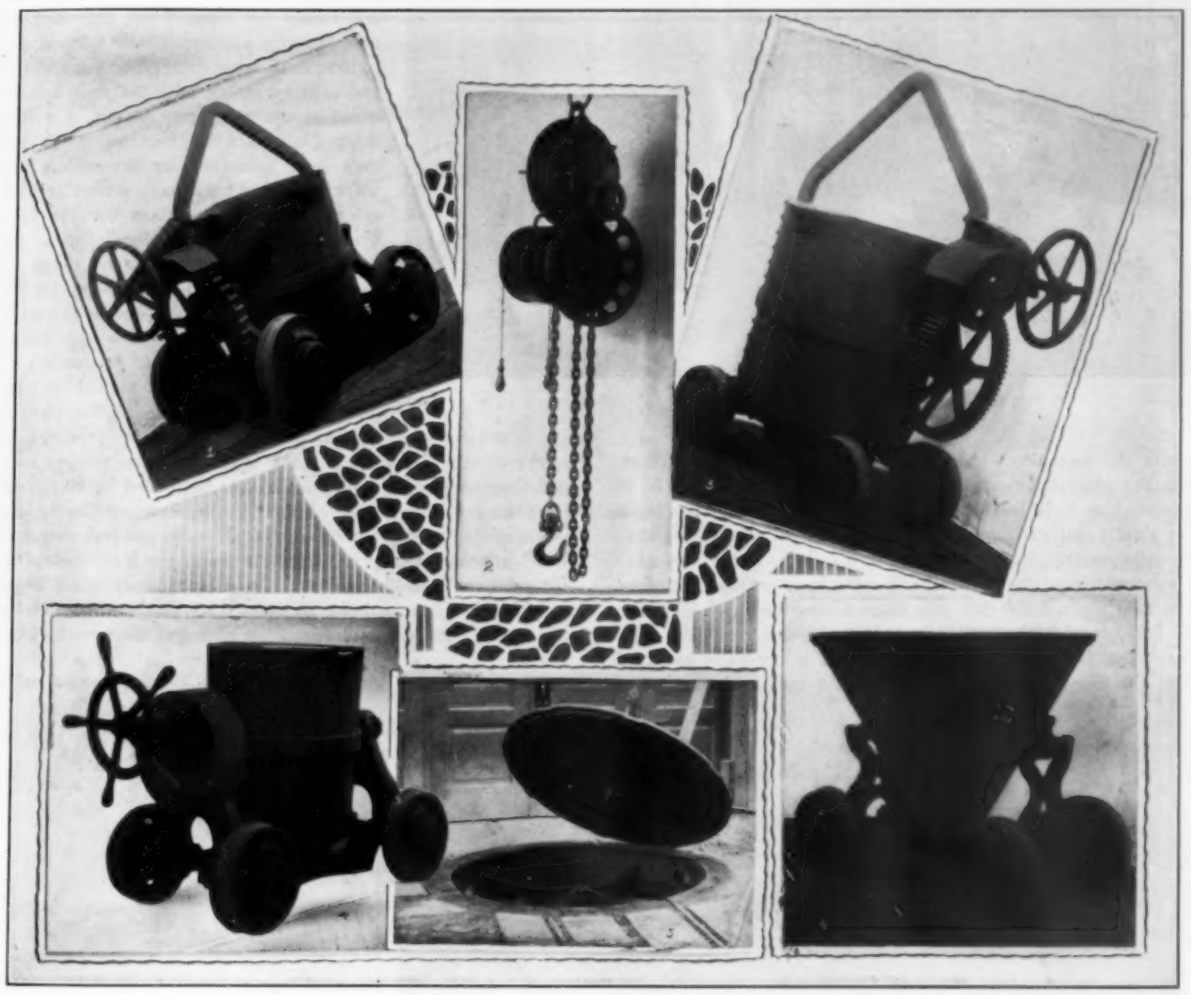


FIG. 6.—1 AND 3. TRANSFER TRUCKS FOR CRANE LADLES. 2. ONE-TON ELECTRIC HOIST. 4. ONE-TON SPUR GEAR LADLE TRUCK. 5. TURNTABLE FOR INDUSTRIAL RAILWAY. 6. DUMP CAR.

of every living thing, and it is a crime to intentionally or carelessly deprive any human being of either.

Along this same general line cleanliness must be spoken of. This is certainly a model shop requisite. Dirt is demoralizing and exerts a physiological influence upon human beings. A good workman is certain to be more or less affected and his work suffer if his surroundings are dusty and covered with dirt. It is really surprising that any sort of good work is turned out in some of the shops I have seen. There is, it is true, a pretext for sweeping, but this is merely a farce. Sometimes the sweeping is done weekly, and sometimes oftener, but the place is always dirty. Cleanliness in the shop is as essential as it is in the office or in the home, and it should be rigidly insisted upon. Make a tour of inspection occasionally yourself in a quiet way and if things are not just what they ought to be, "jack" up the party who is responsible. Make the men understand that you want a shop as clean as it can be kept, furnish the necessary help to keep it clean and then insist that it be kept clean. Of course, it is not to be expected that the machine shop will vie with the public library in the matter of cleanliness, but it is a certain fact that most shops are dirtier than they need to be.

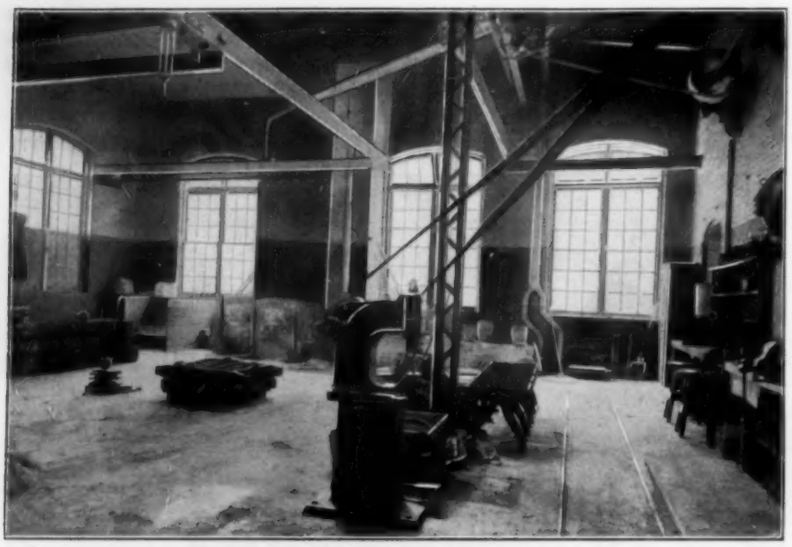


FIG. 7.—INTERIOR OF BRASS FOUNDRY.

Above all things, however, in the creation and maintenance of a model shop is the personnel of the workmen. Without the best workmen that can be had a model shop is not secured. With a force of good, clean, and wholesome workmen, a large step is taken in the accomplishment of the object sought. Care should be taken in hiring men to secure the best that are to be had, and the undesirable should be weeded out as fast and as thoroughly as possible. It is not very difficult to do both of these things. While it is true that as a rule a good workman is not "floating" around the country waiting to be hooked, yet the fact remains that there are good men to be had, and a little patience and good judgment will succeed in getting together a good class of men, and having done this the next thing is to keep them.

There are many little things that have recently been devised by employers for the benefit of their workmen, some of which to my mind ought to be embodied in the management of a model shop.

There are three of these things which I will refer to briefly as desiratum in the management of a shop such as we are discussing.

The first is the premium system, which furnishes a spur or inducement for a workman to do his best in the matter of production. I consider this one of the best things yet brought out, provided the plan is fairly and impartially carried out. In this, as in other things, there are abuses and unfairness, but with the right administration the premium system is a fine thing. It makes the men feel as though they were accomplishing something, and when Saturday night comes the "full envelope" fully repays them for the hard work they may have done during the week. And while it is a good thing for the men, it is also a good thing for the manufacturer, in that his output is greatly increased and at an expense not out of proportion to the increased production.

Another thing that has proved of great help in preserving peace in the shop is what might be termed the privilege of referendum. That is to say, the reference to the men of such questions as directly concern them, to be settled by vote, such as Saturday half holidays, making the time up during the week, and other little questions of the same general character which the owner can consistently refer to the men themselves for settlement. This makes the men feel that they are being considered and treated like men and tends to the strengthening of the cordial relations between the men and the owner of the shop.

The third plan I have in mind is the establishment of a reading room where the men may fraternize after working hours, read the best papers and magazines, study to be better workmen if they wish to study, and, in short, spend their leisure in profitable ways. The expense involved in carrying out such a plan as this is not great and it will pay to take it up. The men will be interested in a place which they can consider as their own, and the results of an intimate acquaintance with the best papers, books, etc., on their part cannot be estimated in the benefit accruing to the general welfare of the community. An intelligent, well-read man is

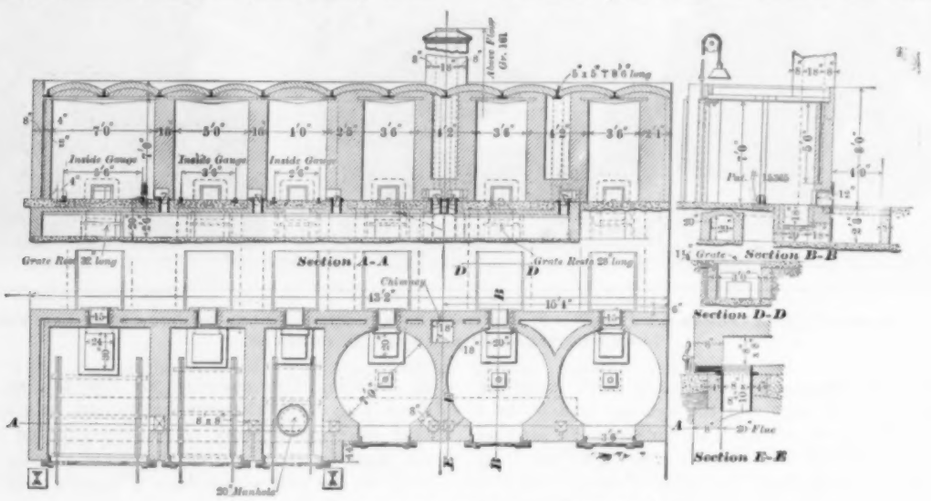


FIG. 8.—CORE OVENS OF THE B. F. STURTEVANT CO.

usually a good citizen, whether a workman or a millionaire, and an intelligent workman is a valuable asset for any business concern.

There is still another thing that ought to be mentioned and that is the policy of encouraging suggestions from the men with reference to the improvement of the manufacturing operations of the shop system. It is an old saying that "two heads are better than one," and this is true in the management of a manufacturing enterprise as well as in other walks of life. This arrangement is being more and more adopted in shops all over the country and it has been shown to be a valuable and a wise plan. Draw up a set of rules governing the matter, stating that suggestions should be made in writing and handed in monthly on such and such a date, and offer a prize for those which are adopted, etc. The value of such a plan will be readily seen, and it will stimulate interest among the men in the shop, and in the work they are doing, and as a result many little improvements will result which will go a long way toward the consummation of the model shop. By all means encourage the men to be interested in the work for the very work's sake and let them feel that you appreciate the fact that they are human beings endowed with brains given them for use.

This paper could not be properly brought to a close without a reference to the question of the labor union. Every thinking man will admit that even from the laboring man's standpoint the model shop arrangements do not include a labor union, with the often arrogant and officious shop committee. The normal healthy conditions in the shop are the old ones where each man thought and acted for himself, where he could appeal as an individual to his employer as he should. It is not my purpose to enter upon a discussion of the labor union question in this paper. Suffice it to say that the labor union is the natural outgrowth of the conditions arising from the gradual loss of close acquaintance and goodfellowship between employe and employer. The unions have done much good, but the fact remains that the model shop does not include the labor union in its system. I state this as my opinion after observation of the conditions produced by the presence of an overbearing shop committee. The employer who needs a labor union to prod him up periodically does not care a snap about a model shop, but the man who wants to operate a model shop will see to it that his men have their just dues and a little more. The writer is not opposed to labor unions. He believes them to be the outgrowth of the increasing chasm between employer and employe, and necessary to correct certain abuses which have grown out of the estrangement. He cannot, however, but believe that the old way of individual dealing is the right way, and employers should aim to be a little better acquainted with their men and make their private office an "open door" to them at any time.

About 1,500 employes of the Pencoyd Iron Works, Philadelphia, are now idle. Among those who received notices are engineers, draftsmen and men employed in the foundries as well as in the steel mills. Many clerks in the offices also received notices. Emil Gerber, who has charge of the structural department, said: "This condition of affairs is chiefly due to the unsettled condition of labor. The large number of strikes and threatened strikes in nearly all branches of trade have frightened builders and investors, and they are holding off to await more favorable conditions. The railroads, which are our best customers, have also abandoned a lot of improvements pending a settlement of the strike question."

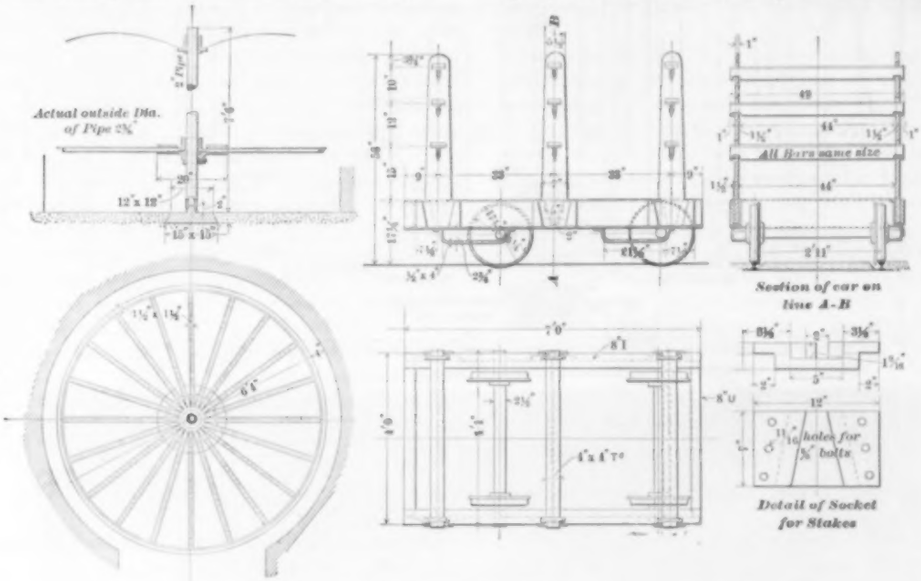

Actual outside Dia. of Pipe 2⅜"
12"x 12"
10"x 10"
All Bars same size
Section of car on line A-B
Detail of Socket for Stakes
holes for ⅝" bolts

FIG. 9.—RACKS AND REELS FOR THE CORE OVENS OF THE B. F. STURTEVANT CO.

FIG. 10.—FOUNDRY CLEANING ROOM, LOOKING WEST.

The Lunkenheimer Co., of Cincinnati, has opened a branch office in Paris, France, at 24 Boulevard Voltaire. A complete stock of brass and iron steam specialties and other engineering appliances will be maintained there.

OHIO BUILDERS FAVOR THE OPEN SHOP.

The open shop was strongly advocated at the meeting at Zanesville, Oct. 29, of the State Association of Ohio Builders. The resolutions prepared by a committee, of which W. H. Hunt, of Cleveland, was chairman, follow:

"This association reaffirms and adopts as its fixed policy the principles of the National Association of Builders 'that absolutely personal independence of the individual to work or not to work, to employ or not to employ, is a fundamental principle which should never be questioned or assailed; that upon it depends the security of our whole social fabric and business prosperity, and that employers and workmen should be equally interested in its defense and preservation.'

"In addition to the foregoing we assert the right of individual trades to deal directly with their workmen upon the question of wages and other conditions of employment without interference or dictation from any individuals or organizations not directly parties to the agreement.

"No person should be refused employment, or in any way discriminated against on account of membership or non-membership in any labor organization and there should be no discrimination against or interference with any employe who is not a member of a labor organization by members of such organizations.

"While this association is not opposed to organizations of labor along legitimate lines it is decidedly opposed to the boycott, the sympathetic strike and any and all forms of personal intimidation.

"This association declares its opposition to the restriction of the opportunities for young men to learn a trade, the rules of apprenticeship being in some of the trades now almost prohibitive and reducing to an unwarranted extent the supply of skilled craftsmen."

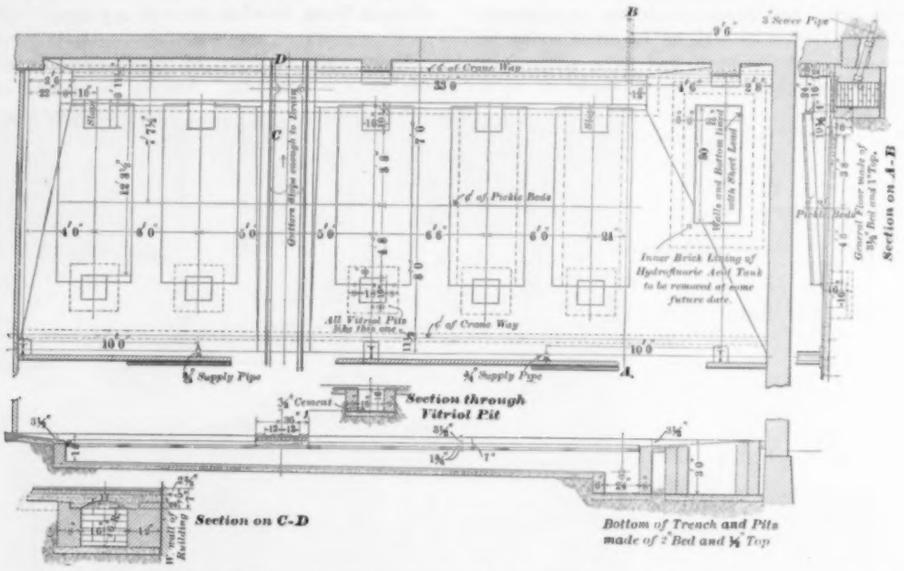

B
D
C
C of Crane Way
C of Pickle Beds
Inner Brick Lining of Hydrofluoric Acid Tank to be removed at some future date.
All Vitriol Pits like this one
C of Crane Way
Section on A-B
Section through Vitriol Pit
Section on C-D
Bottom of Trench and Pits made of 2" Bed and ⅛" Top

FIG. 11.—PLAN OF THE PICKLE ROOM AT THE B. F. STURTEVANT CO.'S FOUNDRY.

FIG. 12.—PICKLE ROOM.

In addressing the convention, Mr. Hunt said in part:

"When men occupying the highest places in industry, commerce and public affairs use their positions of trust for personal gain; when men seek public preferment by means, good or bad, which may insure success, the public conscience protests against this outrage. With equal force does public conscience rebel against the tyranny and utter selfishness of the labor agitator whose reckless policy and inflammatory utterances tend to arouse labor to a feeling of hatred and prejudice against capital and consequently endanger the public welfare.

"The numerical growth of the labor movement, the strength and power exhibited by organized labor, should strive to inspire all branches of the building trades to compact organization. The building trades should unite in support of a fixed, yet wise, policy for dealing with all questions pertaining to labor. What such an organization can do toward the correction of existing evils is incalculable."

An address was also made by Mayor Jeffrey, of Columbus. Officers were elected as follows: President, F. H. Weeks, Akron; vice president, R. L. Quisser, Zanesville; second vice president, R. S. Watson, Columbus; third vice president, W. R. Hattersley, Toledo; secretary-treasurer, E. A. Roberts, Cleveland.

The Rogers Iron Mining Co., capital $300,000, has been formed in the office of J. L. Washburn, Duluth. It is a Rogers, Brown & Co. concern.

Cincinnati Machinery Market.

CINCINNATI, Nov. 3.—The machinery trade is feeling the effect of the general business conditions and a period of hesitation and conservatism is evident in the machine tool trade of this city. While there has been a falling off in the demand which is in sharp contrast with the extreme activity of a year ago this falling off in orders has been noticed for the past three months. In the business world today an observer of conditions is becoming accustomed to hearing of decreasing demand in many lines. It is therefore but natural that the machinery interests should feel the effect of such a situation as part of the great current of manufacturing life in this country. Yet the manufacturers here are not in a discouraging position. There is no question that this city is advantageously situated to manufacture machinery, and as machine tools are so highly specialized here and great effort has been made to bring out improved machines, studying the wants of buyers and aiming at high efficiency in their product, they are still receiving enough business to keep them employed. There has been some cutting down in the number of hours for some of the shops and a few have cut down their working force, but this is not widespread and is to be looked upon in the light of receding from the immense activity and the crowding of men in the shops during the period of abnormal demand.

An effort is now being made again to build up the foreign trade which was somewhat neglected while domestic buyers were taking all the machines that could be turned out. This effort is already meeting with some success and some of the shops report quite encouraging letters from their foreign agencies and a few orders have been coming along.

In the domestic trade the tendency seems to be to hold off but there is considerable correspondence and inquiry so that it is evident that the buyers of machines are still interested. This is backed up by enough demand to keep the shops employed. It is not believed that price inducements would force business at this time and there is little tendency to quote anything but full values on the inquiries. The manufacturers of motors are busy and there has been no important decrease in the demand for this class of work. The future is looked upon hopefully if not with confidence.

In the past month there has been, if any change, an improvement in the number of orders received. Several of the manufacturers report the number of orders received in October as more than had been expected in view of the apparent general falling off in trade.

The John Steptoe Shaper Co. reports an excellent month's business and the company has put on a few hands recently to meet the demands for rush orders. Foreign business is better and orders are now in hand from Sweden, Holland, Australia, and Cuba.

Schumacher & Boye say they have no complaint to make in regard to their business even though orders are not so heavy as formerly. They are now in their new office quarters in the building which was recently erected by them to relieve the crowded condition of their immense plant.

The Cincinnati Milling Machine Co. notes an improvement in orders the past month. Some foreign business has been received and the company has a number of inquiries in hand.

The Lodge & Shipley Machine Tool Co. is bringing out some new machines and finds in the present period of comparative quietude opportunity for the development and perfecting of improvements that have been held up because of the rush of business which has kept all departments fully occupied.

Greaves, Klusman & Co. report a fairly good month as to orders and a very satisfactory run of inquiries. Their shop is running full time and full force.

The Bullock Electric Manufacturing Co. reports that the month of September was the largest in the history of the company's business. The new electric generator now being constructed by the company for the Cincinnati Gas & Electric Co. will be ready by Dec. 1. This is a 2,500-kilowatt generator, a. c. Its full capacity is 5,000 h. p.

The Cincinnati Industrial Bureau, in which the machinery interests of the city are much interested, is doing some effective work. It is announced that through the efforts of this organization the Trees Manufacturing Co., of Greenfield, Ind., manufacturer of gasoline engines, will remove its plant from that place and locate in Cincinnati. The capacity of the plant is to be enlarged. Thomas H. New, of Greenfield, Ind., through the co-operation of the Industrial Bureau, has interested S. J. Watterman and M. B. Dean in the enterprise and the latter have taken an interest with Mr. New in the business. Messrs. Watterman and Dean have a foundry in Covington, Ky. It is probable that the new plant may locate in this city, as it is understood that the Covington foundry will make the castings for the gasoline engines. The move is to be made at once and it is hoped that the new plant will be in operation by the first of the year.

In the coming election of officers of the Business Men's Club, which takes place Nov. 10, the iron machinery industry is well represented. Among the candidates for directors are: William Lodge, of The Lodge & Shipley Machine Tool Co.; Emil Pollak, of the Block-Pollak Iron Co.; E. E. Greenwald, of I. & E. Greenwald Co.; W. L. Chandler, manager Dodge Manufacturing Co., and J. C. Hobart, of the Triumph Electric & Ice Machine Co. The club is a social and business organization with over one thousand members.

FIG. 13.—WASHROOM AND LOCKERS, LOOKING NORTH.

The Scheiffler Roller Bearing Co. is a new concern started in Jackson, Mich., to manufacture roller bearings for line shafting. It has enough orders on hand to keep it busy until the first of the year.

A New System of Motor Traction.*

BY A. W. BRIGHTMORE, D. SC., M. INST. C. E.

It is often the case in investigating a new problem that the results obtained are not exactly those anticipated—but none the less valuable on that account, if accepted with an open mind and properly applied—for the relative importance of the factors involved can then be more accurately gauged. Having gone so far with the elucidation of a problem, the

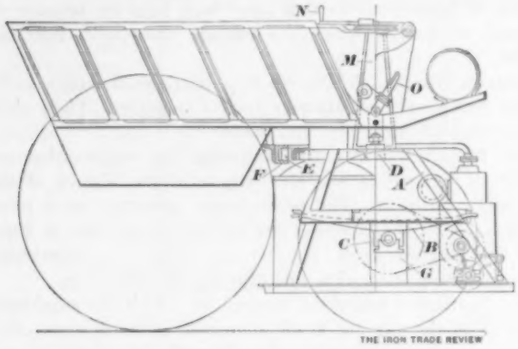


FIG. 1.—FRONT DRIVING, SELF-STEERING, PHAETON. (PAWL AND RATCHET DRIVE.)

investigator finds the responsibilities incurred very different from what he imagined at the outset, but feels encouraged to go on because the measure of success he has met with enables him to see his way through the limitations imposed by conflicting conditions, so that he is likely to be repaid by ultimate success for the cost and labor involved in carrying the investigation through to its logical conclusion. The author proposes first of all to describe the principles of the design of the first car, then to deal with the difficulties that cropped up in connection with running it, and finally to show how the experience gained was incorporated in the design of the heavier type car which has since been completed, and after exhaustive trials given complete satisfaction. He decided not to be fettered in any way by following existing designs, but to study the problems presented and adapt the design to suit the requirements as they appealed to him. This led him entirely outside the beaten track. He concluded that the front wheels must be the driving wheels, also that the connection of the front axle to the body of the vehicle, while being such as to permit of steering, must allow all four wheels to conform to any unevenness of the ground without altering the distribution of pressure on them, *i. e.*, without altering the weight carried by each spring. The author has ventured to give his paper the above title because, so far as he is aware, the resulting system is the only one applicable to heavy vehicles propelled by any kind of motive power, in which the front wheels combine the functions of driving and steering. As is well known, attempts have been made from time to time to drive the front wheels, but in heavy vehicles a difficulty in steering has at once presented itself. When a forecarriage has been used, which required to be turned relatively to the back portion of the vehicle for the purpose of steering, it was found that if the weight on it was sufficient for adhesion of the driving wheels, too much power was necessary to twist the forecarriage by manual effort at the requisite rate for steering, but if the weight on it was reduced sufficiently to render the latter operation possible the adhesion was insufficient for driving purposes. In the system now to be described this difficulty has been overcome by concentrating the weight of the machinery on the driving wheels and effecting the steering without any auxiliary motor by causing the propelling engine to do the turning, *i. e.*, making the vehicle self-steering. It was arranged to carry all the machinery on an independent frame (see A, Fig. 1), supported on springs B on the front axle C, forming the forecarriage. To make steering possible and avoid all strains on the machinery, it is necessary to so connect the body of the vehicle to this forecarriage that the front axle can make any angle with the back axle in either the horizontal or vertical planes. This is most effectually provided for by supporting the body on the two springs on the back axle and for its third point of support connecting it, by means of a ball and socket joint D over the front axle, to the forecarriage. To keep the forecarriage parallel to the road longitudinally a roller E on a horizontal pivot was connected to the center of the back of the forecarriage and this rolled in a circular segment F attached to the body. The ball and socket joint corresponds to the traces in a horse-drawn vehicle, and the roller and segment to the saddle which, in a two-wheeled vehicle, keeps the body level. It will be seen that this connection between forecarriage and body gives all the elasticity that obtains in a horse-drawn vehicle, for, whatever angle the front axle makes with the back axle in plan,

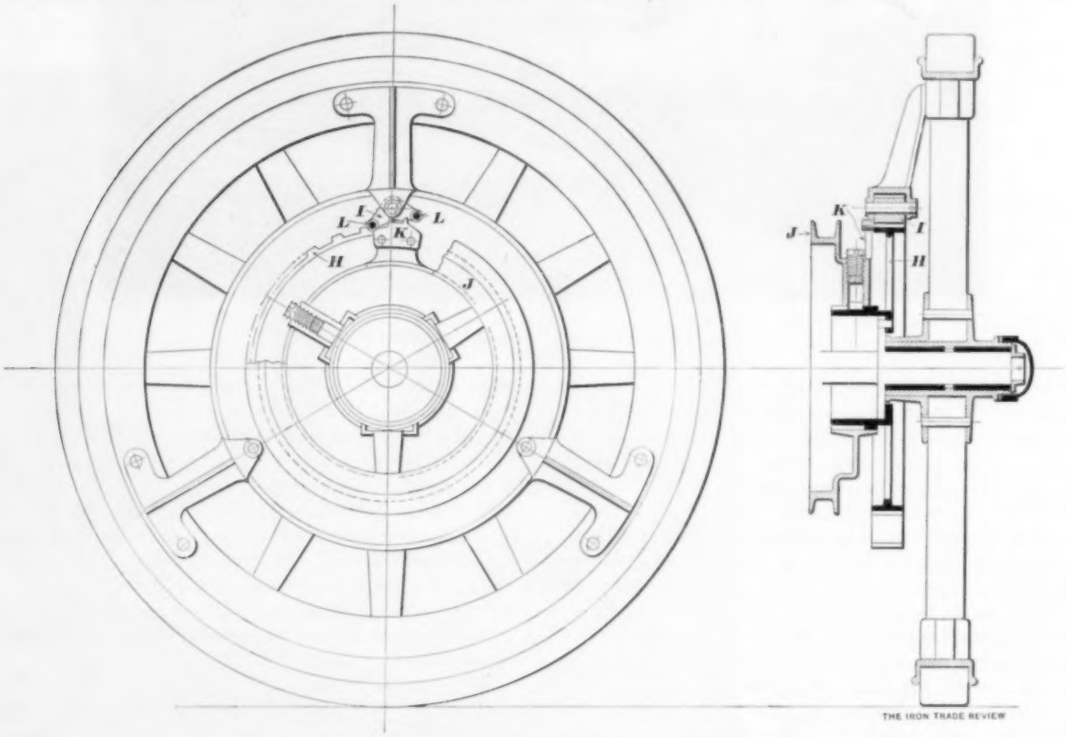


FIG. 2.—WHEEL WITH DRIVING GEAR. SHOWS ORIGINAL CAMS AND PAWL USED ON PHAETON.

*Abstract of paper read before the Liverpool Engineering Society.

the forecarriage can always turn about the line joining the ball and socket to the roller, thus the front axle can make any angle in the vertical plane with the back axle that the unevenness of the ground may require. The motive power used was steam, and the engine and boiler were carried on the frame of the forecarriage, being balanced before and behind the front axle. The oil supply to the burner of the boiler was self-regulating and an automatic water-feed was attached.

The movement of the springs between the frame and axle was provided for by horn plates G on the former sliding in grooves in the axle boxes on the latter. The front axle was a live axle, being driven from the second motion shaft by a chain. Steering was effected by slowing one of the driving wheels relatively to the other one, which causes a rotation of the forecarriage relatively to the body, the latter then following in the wake of the forecarriage.

To permit of this the front wheels were not rigidly fixed to the axle but ratchet wheels (see H, Fig. 2) were connected to it, and double pawls I, to permit of either forward or backward motion, were pivoted to the wheels. In order to disengage one wheel so that a turn can be made, a friction drum J was mounted on the projecting boss of the ratchet wheel and normally turned with the axle, but, having a frictional connection with the latter, it could be caused to lag relatively to it by applying a brake to the drum. From the drum a cam K projects between two pins L near the two ends of the pawl. When the engine starts rotating in either direction these cams come in contact with one or other of the pins and put the pawls into gear for motion in that direction. In order to steer, the brake is applied to the drum on the side to which it is desired to turn, which causes that drum to lag, consequently the pin on the pawl climbs the incline on the cam and that pawl is put out of gear and the vehicle turns until the brake is taken off, when the cam immediately puts the pawl into gear again and the vehicle moves in a straight line. The levers of the steering brakes were connected by wire cords, brought up near the ball and socket joint, to the steering handle N (see Fig. 1) on a column M fixed to the body. By moving this handle to one side or the other steering was effected; by drawing it backwards the steam admission was throttled, and by drawing it back still further steam was cut off from the cylinders, and both brakes were applied together. Stopping brakes applied to a pulley on the hub of each wheel were also pulled on by wires which passed over a pulley on the pedal O applying the brakes so as to equalize the resistance on the two.

The first difficulty that arose was that the steering brakes —at first band brakes—did not come off completely, which caused the pawls to slip on the ratchets. This was remedied by substituting wooden block brakes encircling about a third of the circumference of the friction drums, and covering the blocks with leather to increase the friction. The power of these brakes will be increased in future designs by having the ratchet wheels on the second motion shaft and the pawls on the chain-pinions driving the front wheels. Some trouble was caused by the stretching of the wire cords, and it was decided in future designs to have rigid levers instead. Also, the combination of three duties in a single handle was not found satisfactory in practice, a separate handle for each function proving much easier to manipulate. Next, the rate of turning of the forecarriage, when steering, was found to be too great, causing a certain amount of shock between the pawl and ratchet on coming into gear again after a turn. This convinced the author that there was one property of the horse-drawn vehicle which he overlooked, and that is the resistance or inertia of the horse to rotate on his vertical axis—which has an important influence in steadying the motion.

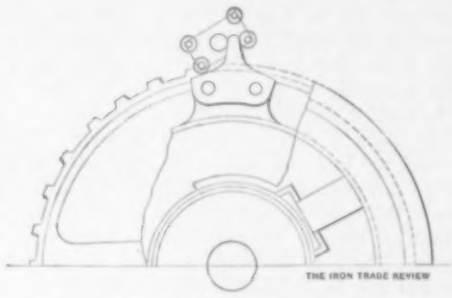


FIG. 3.—CAM AND PAWL FINALLY ADOPTED.

To imitate this and to reduce the rate of turning, instead of the roller working in the circular segment, a slide was substituted; by adjusting the pressure between the slide and the segment to a suitable amount, the rate of turning can be reduced as desired, so that the turn is spread over a longer distance; consequently, after the turn, there is less difference in velocity between the two wheels, and the shock between the pawl and ratchet is avoided. This is an artificial means of increasing the moment of inertia of the forecarriage. This question of avoiding stock, and at the same time getting a sufficiently quick turn, would no doubt limit the weight of vehicle to which the pawl and ratchet could be applied; but for heavier vehicles there is another way of arranging the system to avoid their use, which will be described later. This difficulty being got rid of, it next became apparent that the steering was not sufficiently delicate. There were 32 teeth in the ratchet wheels and the diameter of the driving wheels was 3 feet 6 inches; therefore, missing a tooth meant that one wheel lagged 1-32 of the circumference, *i. e.*, 4 inches, behind

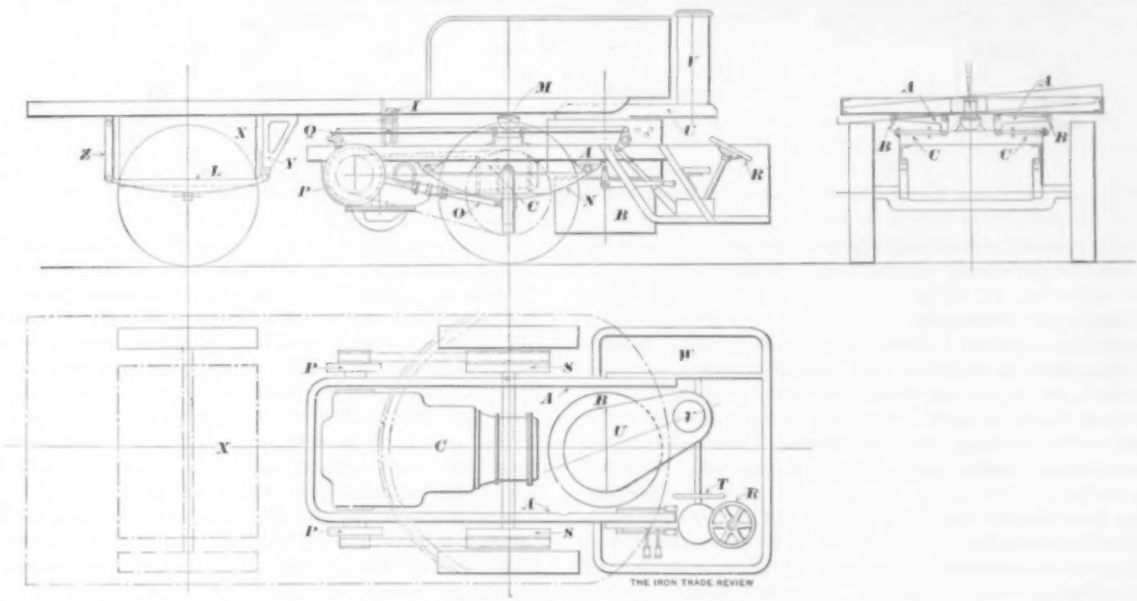


FIG. 4.—FRONT DRIVING, SELF-STEERING, LURRY.

the other. The gauge of the wheels was 4 feet 6 inches, thus the smallest turn would be an angle of 1 in 13. The placing of the ratchet wheels on the second motion shaft, together with the expedient just described for reducing the rate of turning, would increase the delicacy about three times. There is, however, another means of increasing the delicacy of steering, which was employed on the vehicle in question, and that is, by using an uneven number of teeth in the two ratchet wheels. It sounds rather paradoxical when it is stated that by reducing the teeth in one of the ratchet wheels to 24, the delicacy of steering was increased three times. It will, however, be seen that this is the case, because if a tooth be missed on the 24-tooth wheel and afterwards a tooth on the 32-tooth wheel, the resultant turn will be 1-24 — 1-32 = 1-96 part of the circumference of the wheel, *i. e.*, 1⅓ inches instead of 4 inches. Multiples of five and seven for the two wheels are found to have the advantage of giving fine turns to either side. It should be noticed that the operation of steering is in no wise altered by using a different number of teeth. The driver simply turns the lever one way or the other until he gets into the desired direction, which he can do with a high degree of precision in this case—he need not even know that the numbers of the teeth are uneven. This method was found very effective in practice. There is practically no limit to the delicacy of steering that may be obtained in this manner; if, for instance, the numbers of teeth in the two ratchets be taken as 35 and 49; missing a tooth first on one side and then on the other gives a turn of 1-35 — 1-49 of a revolution = 2-245 of the circumference of the driving wheel; if a tooth be missed first on one side and then on the other several times this would be reduced being done away with, the latter then assuming the shape of an inverted Y. As at first arranged the steering pillar was connected to the body of the vehicle and all the manipulating handles connected thereto, wire cords being used to communicate the motion of the handles to the steering brakes, etc. It was found, however, that owing to the fact that the cords could not all be brought up at the center of the pivot, although all were near to that point, the tightening of some of the cords when a sharp turn was made caused some difficulty. The steering pillar was therefore disconnected from the body and attached to the forecarriage. This got over the difficulty mentioned, but at the expense of the manipulating handles moving relatively to the driver; and it led to the conclusion that the system would be immensely simplified if applied to larger vehicles in which the driver could be placed on the forecarriage, for this not only does away at once with the complication of transferring the manipulation from the forecarriage to the body, but it makes the steering positive, and the driver can, in steering, turn the forecarriage the exact amount necessary to "sight" it in the required direction, instead of steering by the trial and error method as illustrated in the Ackermann form.

Having arrived at this conclusion, and found out the points to be attended to in the design of vehicles on this system, it appeared that the best way to put it to a crucial test would be by building a large vehicle in which the driver would be placed on the forecarriage, and incorporating in the design the results obtained in the experiments just referred to, making such alterations in the design as the greater moving mass would necessitate.

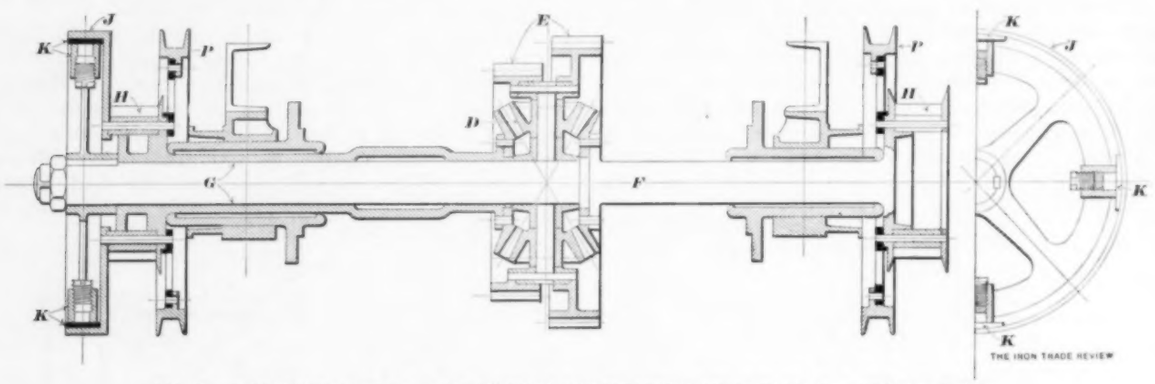


FIG. 5.—COMPENSATING SHAFT WITH STEERING AND STEADYING SHAFT DRUM OF 5 TO 6 TON LURRY.

to half; it would be diminished farther three times by fixing the ratchets on the second motion shaft, consequently the finest turn would be 1-735 of the circumference, or 1 in 300. As a maximum, the divergence from the desired direction in a straight line would be 8 feet 9 inches, if no steering is done in the meantime. It would be quite impossible with Ackermann stearing gear to set the wheels for going straight forward for even a score of yards—for a mile is absolutely out of the question—the tendency with that method of steering being to run in circles, whereas with the system now being described the tendency is to run in straight lines. A minor difficulty arose from the fact that the pawls were not pivoted about their centers of gravity, so that springs had to be used to keep them in gear; in future designs the pawls will be made lighter and pivoted at their center of gravity. A further objection in connection with the pawls, as at first arranged, was that sometimes the pawl would just catch on a tooth on the ratchet wheel without coming properly into gear, in which case it was liable to be forced out of the gear again. This uncertainty was very effectively got over by steepening the teeth of the ratchet wheel and the slope of the working face of the pawl, until, if the heel of the pawl clears the edge of the tooth, there is time for it to come properly into gear; because the last part of the twist of the pawl is very rapid, being produced by the rolling of the other pin up the steep portion of the cam, which moves the working face of the pawl away from the tooth. It will be noticed (see Fig. 3) that both the pawl and the cam were simplified from their initial forms, the central projections on the pawl, also the notch in the cam,

Designs for such a vehicle to carry five tons were prepared, and the order placed for it with Messrs. T. Coulthard & Co., Preston, the builders of the first vehicle, who suggested that, in order to reduce the cost as much as possible, as many of their standard parts as could be worked in should be used. This was done as far as the radial differences between a front and back drive and the totally different method of steering permitted. The placing of the driver on the forecarriage (see A, Fig. 4) made it possible for the boiler B to be arranged to be entirely under his eye, by placing it on the forecarriage before the front axle—the driver sitting to the right of it. The engine C of the horizontal type was placed on the forecarriage behind the front axle, so as to partially balance the weight of the boiler, etc., and it has the advantage of giving a fairly long forecarriage, which causes its moment of inertia about the ball and socket pivot to be considerable. This reduces any tendency for the forecarriage to be diverted from its direction of motion, in fact, it will pass over considerable obstacles without any divergence whatever. This rendered the pawls and ratchets unnecessary for locking the wheels to preserve their direction of motion, consequently, in order to do away with any question of shock between the pawls and ratchets, if used in this case of a heavy vehicle, an ordinary differential gear (see D, Fig. 5) was substituted for them, steering being effected in the same way as before by causing the driving wheels to move with different velocities until the forecarriage turns the required amount. The engine used was Messrs. T. Coulthard & Co.'s standard type of horizontal encased engine, driving on to spur wheels E, in which the

planet wheels of the differential gear are mounted. The bevel wheel on one side of the differential is connected to the shaft F to which the chain pinion H driving the front wheel, on one side, by means of a Hans Renold silent chain, is attached; and that on the other side of it to a sleeve G, surrounding the shaft, and to which the chain pinion H driving the other wheel is fixed. To these chain pinions the steering drums P are bolted, consequently, when the brake is applied to either, the speed of the chain wheel on that side would be reduced and the speed of that on the other side increased, causing the forecarriage to make a turn and steering to be effected without affecting the forward speed of the vehicle. For steadying the vehicle a resistance may be introduced between the slides (see I, Fig. 4) and the segment on the carrying platform, or it may be more effectively placed between the shaft on which one part of the differential is connected and the sleeve to which the other part is attached by connecting a drum (see J, Fig. 5) to one of these, and one or more adjustable blocks K, which press on the drum, to the other.

These being the chief modifications of the principles involved, the author will now describe the vehicle as built, but he may at once state that this vehicle does not possess the interest from the experimental point of view that the first one did, as it has required practically no alteration since it was completed, in fact, it steamed out of the works at the first trial. One addition has been made which, however, is not essential, but it has the object of damping any oscillations that may occur in the carrying platform when taking a high load, without affecting the front springs.

The overall length of this lurry is 18 feet, the platform length 16 feet, breadth 6 feet 6 inches, and height 4 feet 6 inches. The wheel base is 8 feet, the diameter of wheels 3 feet 6 inches, breadth of tires on front wheels 7 inches, and on the back wheels 6 inches.

The carrying platform is supported on the back springs L (see Fig. 4), and connected by a ball and socket joint M over the front axle to the forecarriage. The latter is kept parallel to the road by a slide I on a horizontal pivot connected to the center of the forecarriage at the back, which moves in a circular segment attached to the carrying platform, as before. The frame of the forecarriage is supported on the front springs N by slippers, which permit of its sliding on them. The front axle is held in position, relatively to this frame, by radius rods O pivoted to it at either end, the other end of each radius rod being in the form of a strap encircling the bracket on the frame supporting the bearing of the differential shaft. Thus, the pull of the driving axle is transmitted through the radius rods and the forecarriage frame to the carrying platform at the ball and socket joint.

The brakes on the steering drums P are applied by bell crank levers Q, carried by a cross shaft, which is moved by the hand steering wheel R through a worm and toothed sector by means of levers; when this shaft is turned in one direction one brake comes on and the other is taken further off, and vice versa, so that only one steering brake can be applied at a time. This brake consists of a ⅜-inch diameter special steel wire rope with gun metal blocks clipped on to it.

Stopping brakes are provided for both front and back wheels. The former are applied to drums S attached to the wheels, and are of the same design as the steering brakes, being pulled on by a wheel T on a horizontal shaft with right and left handed threads working into nuts on the bell crank levers attached to the brakes, so that one brake is pulled on off the other, giving an equal resistance on both drums, and so avoiding turning the forecarriage when they are applied.

The brakes on the back wheels are block brakes applied by a wheel working on a threaded rod. The boiler is of the fire-tube type, with a grate area of 3.75 square feet and 108 square feet of heating surface, having 342 tubes ¾-inch internal diameter; there is a drying space at the top, and it has been very free from priming. The working pressure is 200 pounds per square inch. It is coke fired; a fusible plug is fitted over the center of the firebox. In addition to the feed pump worked from the engine a small "Marsh" steam pump is also fitted. Both pumps are connected to the boiler through a combined plug and check valve, so that the former can be closed and the latter examined while the boiler is under steam. The pressure and water gauges are placed so as to be readily seen by the driver. The smokebox is connected to a horizontal flue U, which acts as an efficient spark arrester, and this terminates in a vertical funnel V, which comes immediately in front of the carrying platform. The engine, before referred to, is a reversing compound, with high and low pressure cylinders 4 inches and 7 inches diameter respectively, and a common stroke of 6 inches; it is fitted with a pass over to admit high-pressure steam into the low-pressure cylinder for emergencies. The gears are designed for speeds of three and six miles per hour with the engine running at 450 revolutions per minute, but as the latter is so well balanced that it is capable of running up to 600 revolutions per minute, it has been found that the car will haul a 5-ton load at eight miles per hour with great ease on reasonably good roads. All the wheels and handles for the manipulation of the vehicle can be worked by the driver from his seat on the right-hand side of the boiler. The steering wheel is in front of him, the throttle valve to his left, the reversing and change-speed levers to his left lower down, the multiplying gear handle and the lever to the cylinder drain handle to his right, the brake wheel for front brakes in front below the steering wheel, and the handle for back brakes behind him. The coke bunker W, which holds 2½ cwt. of coke, is to the left of the boiler and the water tank X, having a capacity of 170 gallons over the back axle. A water lifter is used to fill this tank.

The front ends of the back springs are pinned to a horizontal channel steel attached to two brackets Y beneath the platform, lateral stiffness being given to the brackets by two diagonal tie rods. The back ends of the springs are connected to the platform by links Z having diagonal stays for lateral stiffness, both links and stays turning on a common horizontal axis to allow for the play of the springs.

In order to damp any oscillation of the carrying platform about the front end, where it is supported at a single point, a bell-crank lever A (see Fig. 4—Front Elevation) was pivoted at each side of the ball and socket joint to the stiff steel channels supporting the latter. The ends of the horizontal arms of these levers slide on a circular path B on the platform and the ends of the vertical arms are attached to strong spiral springs C fixed at one end to the same channels, so that any oscillation of the platform has to compress one or the other of the springs and is quickly damped.

In conclusion, the author will summarize the chief features of the above system. When light, over three-quarters of the weight is on the driving wheels; when loaded, the additional weight comes evenly on all four wheels.

The pressures on the wheels are not varied by unevenness of the ground, because of the method of articulating the forecarriage, which carries the machinery, to the platform.

The carrying platform extends for practically the whole length of the vehicle.

The steering is positive, *i. e.*, the forecarriage can be "sighted" in the direction it is wanted to travel; and owing to the small wheel base very sharp turns can be made and the vehicle maneuvered in restricted spaces.

The power is always exerted in the direction of motion, consequently there is no side slip. The machinery is free from any strains due to the load, and is very accessible, even when the vehicle is loaded.

The forecarriage, which is entirely self contained, can be taken out of one vehicle and run by itself if provided with a small wheel to let down before and behind for balancing purposes; it can be connected to another body if desired. The lurry starts remarkably steadily, the running is unusually quiet, and the freedom from vibration either on the forecarriage or platform is very noticeable.

The author has already stated that there is no side slip with this system, which he attributes to the fact that the power is always exerted in the direction of motion. That the slip in the direction of motion is quite a negligible quantity will be seen from the following experience: It was found that the lurry had a tendency to veer to the left. The question was carefully considered as to whether there were any unbalanced inertia effects which had been overlooked, which might be producing this deflection, but nothing of the kind could be discovered; it then occurred to the author that the driving wheels might not be quite the same diameter. On measuring them the off-side

one was found to be ¼-inch larger in diameter than the near one. To test whether this was really the correct explanation, the two wheels were interchanged, and it was then found that the tendency of the lurry was to pull from its own side of the road into the center. This showed conclusively that a difference of ¼ inch in diameter of the two driving wheels was uniformly apparent in the running, consequently the slip must practically be non-existent.

The author does not wish it to be understood that a slip has never occurred with this vehicle, and it will probably be of interest to know what happened when it did occur. It was on a fairly steep incline paved with rounded cobbles, laid so as to produce a series of small depressions. The road had been negotiated by the vehicle light as well as loaded several times without difficulty, but it was attempted after new cobbles, in their smoothest state, before being worn by traffic, had been put down. At one of the worst parts, one of the wheels refused to grip; as a result the other wheel stopped and the slipping wheel whizzed round till steam was shut off. The lurry was backed and got into the middle of the road, and then climbed the remaining portion without difficulty. The slightest projections on the tires of the wheels would have enabled a grip to be obtained, and it is to be hoped that, when the law relating to motor vehicles is modified, shallow strips on the driving wheels will be permitted. These would be useful in case of frost.

The reason why the lurry does not twist round if one wheel slips is because the driving is done through the differential gear. If the resistance is the same on each side of the differential both chain pinions revolve at the same rate; but if the resistance on one is suddenly taken off either by that wheel slipping or by its chain breaking, the other pinion is no longer driven, but that on the free side would revolve at twice the rate of the spur wheel on the differential.

Prosperity of the West.

Everett B. Webster, president of the National Wire & Steel Co., has just returned to New Haven, Conn., from a trip of 7,000 miles throughout the United States with a party of English capitalists, who are interested in his company. In an interview Mr. Webster said:

"No one could take such a trip and talk with the bankers and business men throughout the west and south without returning enthusiastic over business prospects. The National Steel & Wire Co. manufactures, among its various products, wire fencing, and has something lige 9,000 agents throughout the west, so that we are naturally in touch with the farmers. All our reports indicate that not only will the United States this year have one of the largest corn crops in its history, but the quality will be excellent. I found business conditions good. Everybody whom I met west of Chicago anticipated a big year, based upon agricultural prosperity. All business houses reported collections good, an indication that the western communities are will supplied with money. In the big cities, like Kansas City, St. Louis and other cities further west, bank clearances are the largest in its history. Western people apparently pay little attention to stock market conditions, and seem to know little as to the causes for the decline in security values. They see no reason for shrinkage in values, based upon the volume of business as they see it. On the whole, I returned from my trip with the belief that any depression in business can be but a reflection of stock market conditions. and hence can be but temporary."

The Maryland Steel Co., Sparrows Point, Md., is enjoying a most prosperous year. Within the past three months between 800 and 1,000 extra men have been given employment in the marine department. Even the steel rail mills are fully employed, although new orders are not as numerous as they were a few months ago. One of the large contracts on which work is now being done is the immense floating drydock being built for the United States Government, for use at the Naval Station at Cavite, Philippine Islands, which will be finished in the spring of 1905. Five steel dredges for the United States Government and a submarine tender for the quartermaster's department are also in course of construction. A large freight steamer is being built for the Atlantic Transport line.

THE GEORGE ROLL SUPPORT.

In high-speed two-high rolling mills for light sections it is often desirable to hold the lower roll down in its bearing as well as to hold the upper roll in place. The George roll support was designed to accomplish this result and has proved to be very efficient in actual practice. The accompanying illustration represents a continuous rod mill housing fitted with the device.

An important feature of the construction is that the supporting members have sufficient flexibility to permit of the ordinary roll adjustments without appreciably affecting the pressure on the roll necks. The rolls are held apart by two "floating" blocks of hard wood placed between each pair of necks. On one side of the "window" the blocks fulcrum against each other and on the other side they are held apart by means of a metal wedge operated by a screw running through the housing. The screw is threaded into the wedge only. Back of the threaded portion of the screw there is a collar which rests in a recess concentric with a plain drilled hole in the housing.

By slacking the pressure on the wedge the blocks are easily removed for roll changing. It is not necessary to remove the

THE GEORGE ROLL SUPPORT.

wedges when changing rolls, although this can be done with perfect ease.

It will readily be seen that the construction is as inexpensive as it is simple and effective. Through several years of use it has been found that owing to the absorbent qualities of the wooden blocks they never run quite free from lubricant and consequently have a longer life with less attention that is required with porous metal bearings.

The device is the invention of J. R. George, of the Morgan Construction Co., of Worcester, Mass.

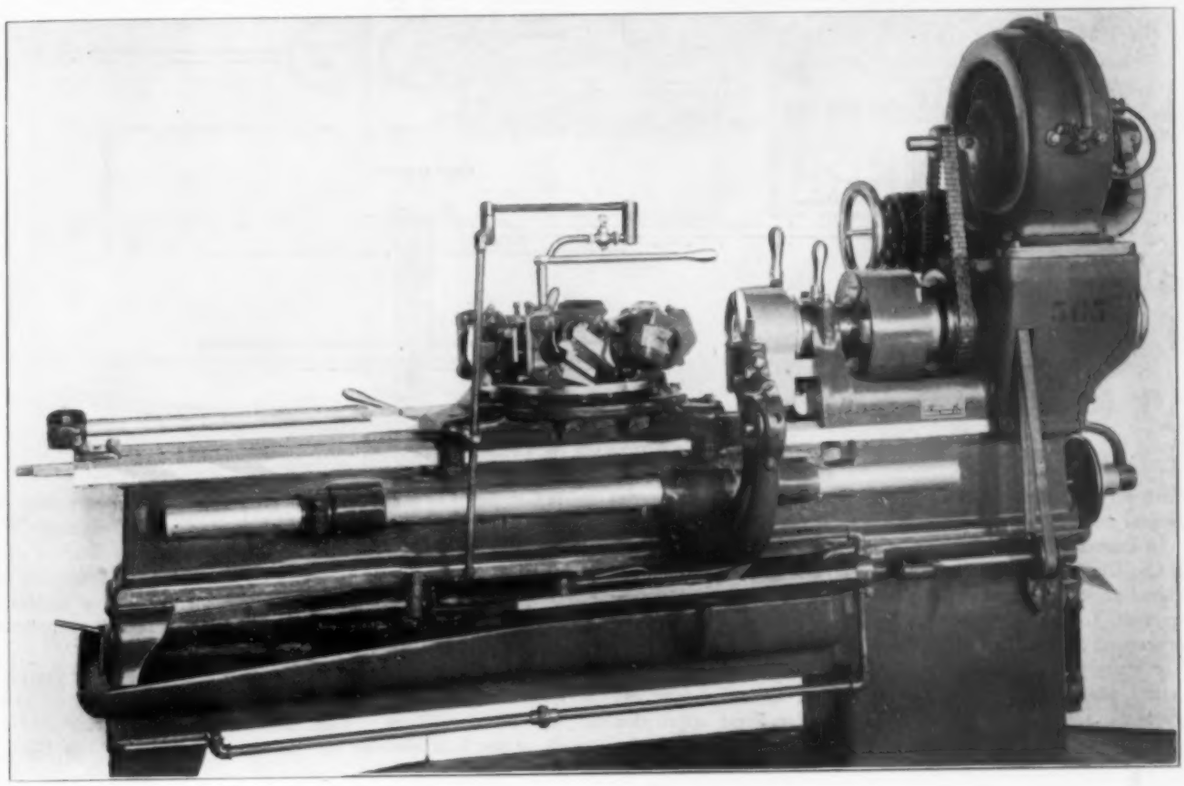
A. G. Hathaway & Co., Cleveland, now have the agency of the Pittsburg Piston Packing Co., for this district, and have placed some large orders with some of the prominent concerns of Cleveland. This packing acts as a flexible joint, lubricates the piston, will not cut out the rod and is guaranteed for from one to two years.

Tracy C. Becker, receiver for the New York Car Wheel Works, has asked the court to have the plant sold. Referee Hotchkiss, after intimating that $100,000 must be received for the plant before he would consent to the sale, named Nov. 5 as the time for the meeting of creditors to consider the proposed sale.

A MOTOR-DRIVEN TURRET LATHE.

Combine with a machine tool renowned for its rapid and accurate work, the use of motor-drive with variable speed control, and the result is as close an approximation to the ideal equipment as it is possible to produce. Such an outfit is shown in the accompanying cut, which represents a Hartness flat turret lathe driven by a Crocker-Wheeler, Form F, motor. It is a machine for doing general lathe work, in sizes not exceeding 2 inches in diameter and 24 inches in length. Hence, it is known as a 2x24 lathe, although with special appliances it may be fitted to take bar stock as long as 36 inches, or chucked work up to 14 and even 16 inches in diameter. Naturally, the maximum economy effected by its use is realized when turning quantities of identical pieces. On such work it is usually allowable to make the limit of variation each way from nominal size .0005 to .001 of an inch, but at a sacrifice of output it is possible to work as close as .00025 of an inch.

Among the distinguishing features of the lathe may be mentioned the peculiar form of the turret, its independent feed stop for each position, the roller feed for advancing the work at the conclusion of each cycle, and the swinging die carrier. The



AN ELECTRICALLY DRIVEN TURRET LATHE.

details of the machine have been discussed in *The Iron Trade Review*, and an article on the interesting plant at Springfield, Vt., appeared in our issue of July 3, 1902.

A substantial construction is maintained in the head stock to afford strength and the rigidity necessary to accurate performance. The motor has a capacity of 5 horsepower at 1,100 revolutions per minute and 240 volts and is mounted directly over the spindle which it drives by means of a Renold silent chain. Beneath the spindle is placed the regular back-gear, and, when required for large diameter work, a triple back-gear is placed below the regular one. The gears are thrown in or out of operation by friction clutches so that it is not necessary to stop running while making the change. From the motor to the sprocket on the spindle there is a 3 to 1 speed reduction, the first back-gear reduces again by a ratio of 4 to 1 and the second gives 16 to 1 from sprocket to spindle. The motor being supplied with current on the 4-wire multiple voltage system, of the Crocker-Wheeler Co., is capable of six speeds by the separate voltages and six more by the use of one resistance, or twelve in all in either direction. The highest speed is 1,100, which transmitted direct to the spindle turns the latter at about 370 revolutoions per minute. The motor's slowest speed, 162 turns per minute, communicated through triple back-gear, makes the slowest speed of the spindle 3⅓ revolutions. Between these limits there is a total of 36 different speeds in direct or reverse rotation.

The Hartness flat turret lathe is manufactured by the Jones & Lamson Machine Co., of Springfield, Vt., the entire works being devoted exclusively to it and its equipment.

William Waldo Hyde, attorney for the Berlin Iron Bridge Co., Hartford, Conn., has obtained an order to wind up the affairs of the company. Three months are given for the presentation of claims against the company. The assets are said to be largely in excess of the liabilities.

The Pennsylvania Railroad Co. has issued orders to cut down the force in the Altoona shops 10 percent, which will necessitate the suspension of 800 men.

The Jackson Motor Carriage Co., Jackson, Mich., has been incorporated to manufacture gas engines and accessories. The engine and machine work will be let out on contract and made to the company's specifications. It will only have an assembling plant at Jackson.

Patterson, Gottfried & Hunter, Ltd., New York, have acquired the exclusive selling agency for the Robinson right angle drive manufactured by the A. Standish Estate, Columbus, O.

The Tennessee Iron & Metal Co., Chattanooga, has filed a statemeent of its liabilities, which are scheduled at $39,316, and its assets, which are given at $8. The company dealt in scrap.

The Toledo freight committee has received an application for a reduction of rates on pig iron to Indiana gas belt points. The committee will recommend to the Central Freight Association that the reduction be made.

The Berwick Malleable Iron Co., Bloomsburg, Pa., has closed indefinitely, throwing 300 men out of work.

New Blast Furnace Plant of the Toledo Furnace Co., at Toledo, Ohio.

In the campaign of blast furnace construction which has been so active in the United States in the past four years a noteworthy feature has been the erection at lower lake ports of a number of well equipped furnaces for the production of foundry iron. Detroit, Toledo, Cleveland and Buffalo are all represented in this list, the movement giving emphasis to what had long been said as to the advantage of lake shore locations, with direct unloading of ore into furnace yards, for the economical manufacture of pig iron.

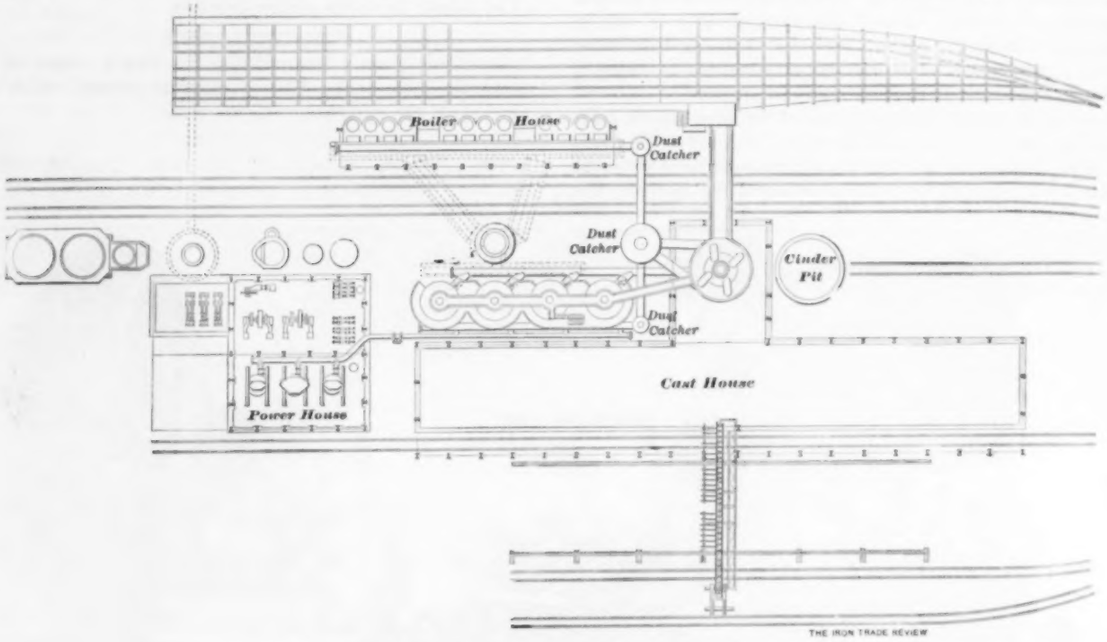


FIG. 1.—PLAN OF TOLEDO FURNACE CO.'S PLANT AT TOLEDO, OHIO.

In February, 1902, members of the firm of Pickands, Mather & Co., Cleveland, organized the Toledo Furnace Co. which acquired about 100 acres of land on the east bank of the Maumee river at Toledo, at a point seven miles from Lake Erie, and proceeded to carry out plans for a modern blast furnace plant. For many years Pickands, Mather & Co. had been makers and sellers of foundry iron. Their important Lake Superior ore connections, strengthened in recent years by direct acquisition of valuable ore properties, and their vessel, dock and coal interests made the Toledo enterprise a natural step, and it can be easily understood how much larger things than now appear may develop. There is plenty of room for extension—but of this nothing definite may be said at present. The officers of the Toledo Furnace Co. are the following: H. G. Dalton, president and treasurer; Samuel Mather, vice president; E. P. Williams, secretary; E. H. Williams, general manager.

Chief of the attractions of Toledo as an iron-making location were its excellent harbor and shipping facilities. There is a 900-foot channel of a depth of 21 feet all the way to the heart of the city, or eight miles from the mouth of the Maumee river. As a railroad center the city is famous, a dozen important lines giving it outlets north, south, east and west. Coal and ore docks have for some years made it an important lake point for mineral traffic. Within the past 18 months the completion of the Toledo Railway & Terminal Co.'s belt line, 35 miles long, known as the "new belt line" in distinction from the old inner belt maintained by a number of railroads, has added greatly to the manufacturing facilities of the city. As a distributing point for a furnace supplying the foundry trade it has marked advantages.

The riparian rights to the 21-ft. channel line gave the furnace company 500 feet from the low water stage on its 2,500 feet of river front. This was reclaimed for a length of about 700 feet, and, as will be seen from the view in Fig. 4, has added considerably to the acreage. The photograph was taken while the work of filling was in progress after the dock had been built out at the Government deep water line. The dock, which is of hemlock below the water line, and of oak above, is 708 feet long, and required 1,350,000 feet of timber. It is 40 feet wide on the bottom and 32 feet deep, stepping down in three sections from the width on top. The

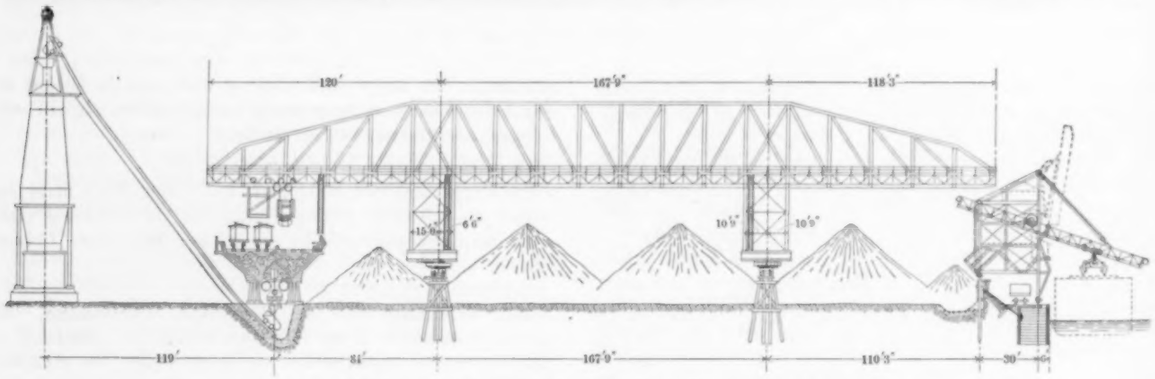


FIG. 2.—SECTIONAL ELEVATION OF ORE HANDLING PLANT AND BIN SYSTEM.

FIG. 3.—VIEW OF TOLEDO FURNACE CO.'S BLAST FURNACE PLAN

Power House, Water Softening Plant, Condenser and Standpipe on right adjoining Stoves, Draft Stack and Furnac

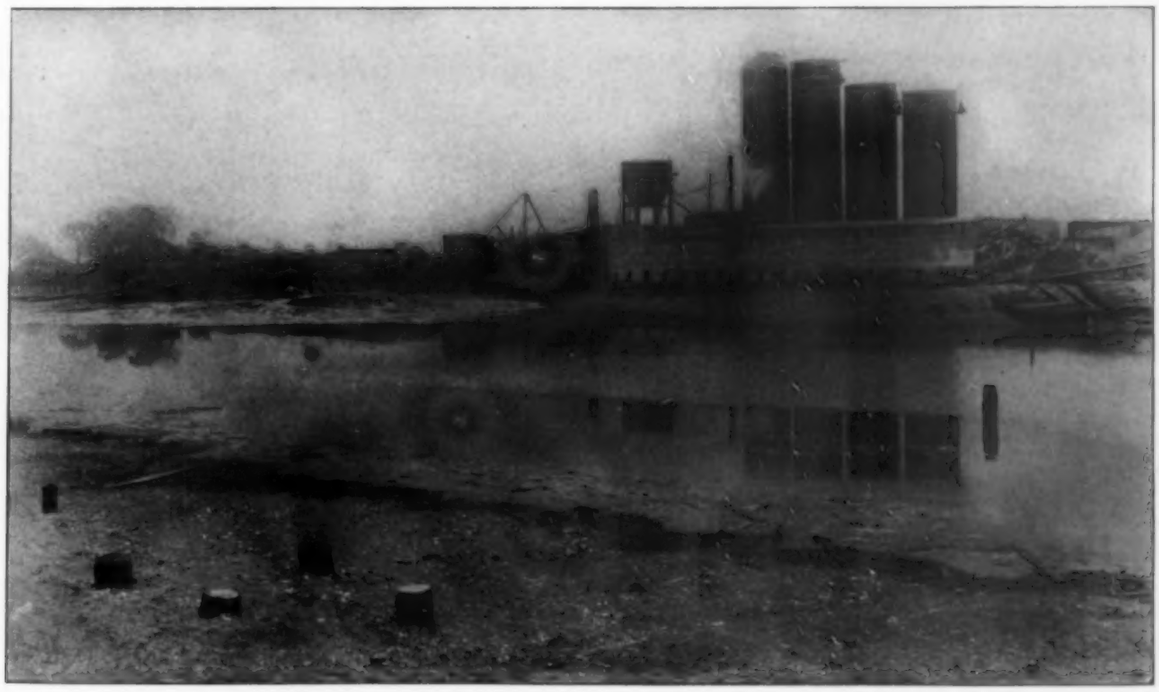
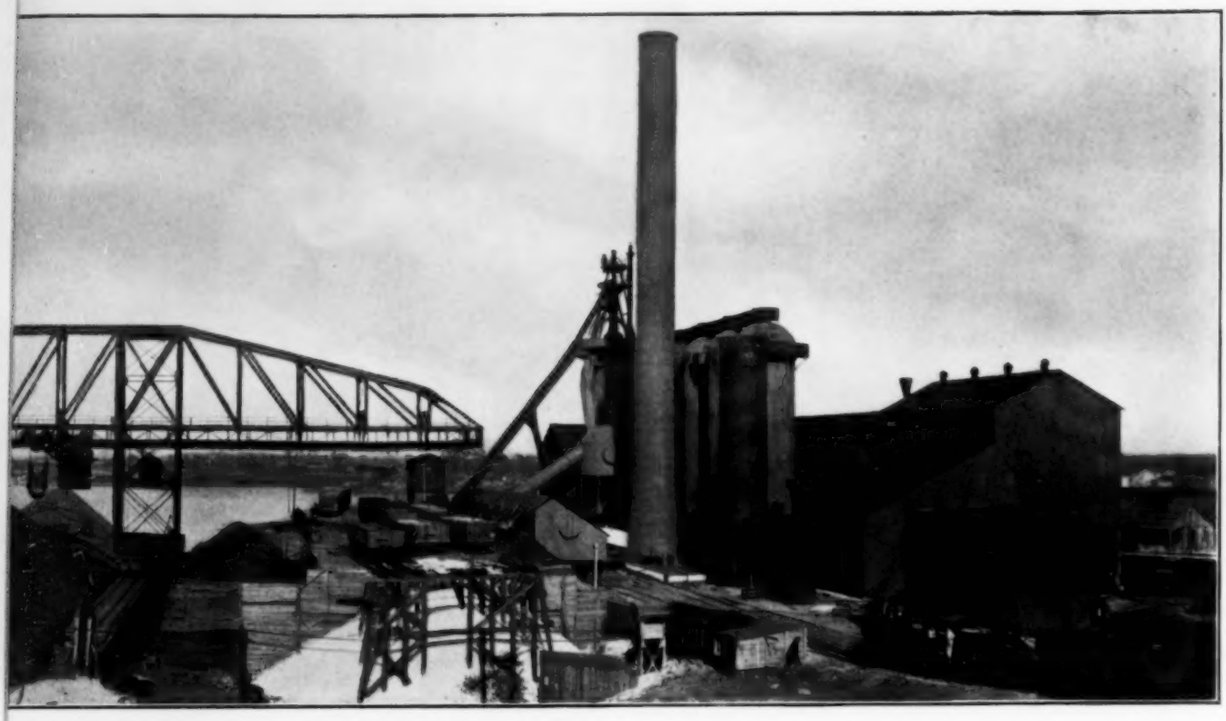


Fig. 4.—View of the 500x700 feet of sand fill, taken from the southwest corner of dock, September 9, 1902. Pipes discharging the pumped sand appear on the left.



LAST FURNACE PLANT AT TOLEDO, OHIO.

ts, Draft Stack and Furnace; then in order, Bin System, Ore Yard, Trough and Dock.

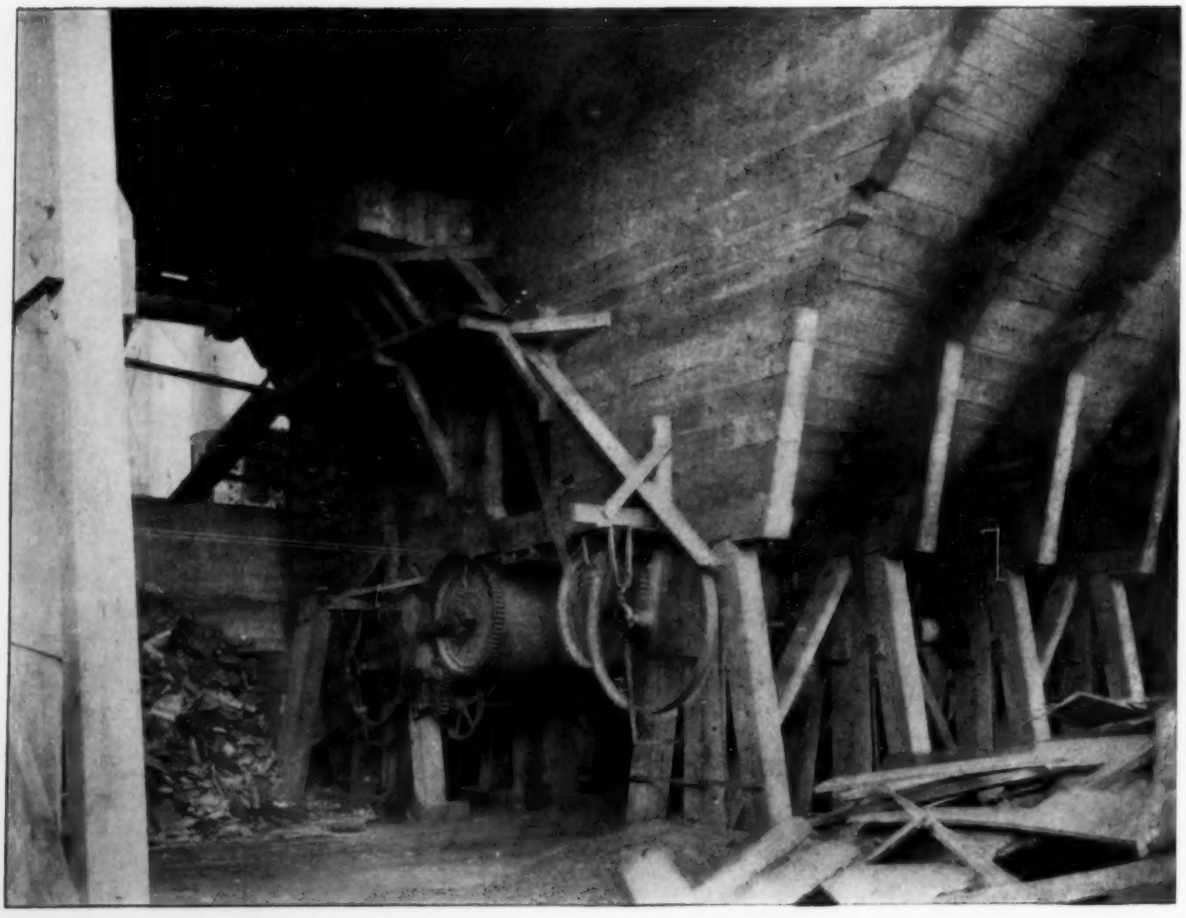


Fig. 5.—Showing Construction of Wooden Pockets.

entire structure is in eight-foot compartments, all but eight feet being below water. It was built at a yard several miles up the Maumee and towed to its present position, where a considerable excavation has been made to receive it. It was sunk by filling it with sand. The filling of the 500 feet between the dock and the original water line was accomplished, as shown in Fig. 4, by pumping sand which Government dredges had dropped in the river alongside the furnace site. There was thus pumped 175,000 cubic yards of sand.

The blast furnace foundation work presented little of the difficulty often met with, hard pan being found a few inches beneath grass roots. The base line taken was the government datum, the Lake Erie level being 92.14 feet above it, the dock level 100 feet and the track level 114 feet. Piles were driven under the ore bin system and under the two lines of supports for the ore bridges. The piling was in the sand fills which were 25 feet at the deepest.

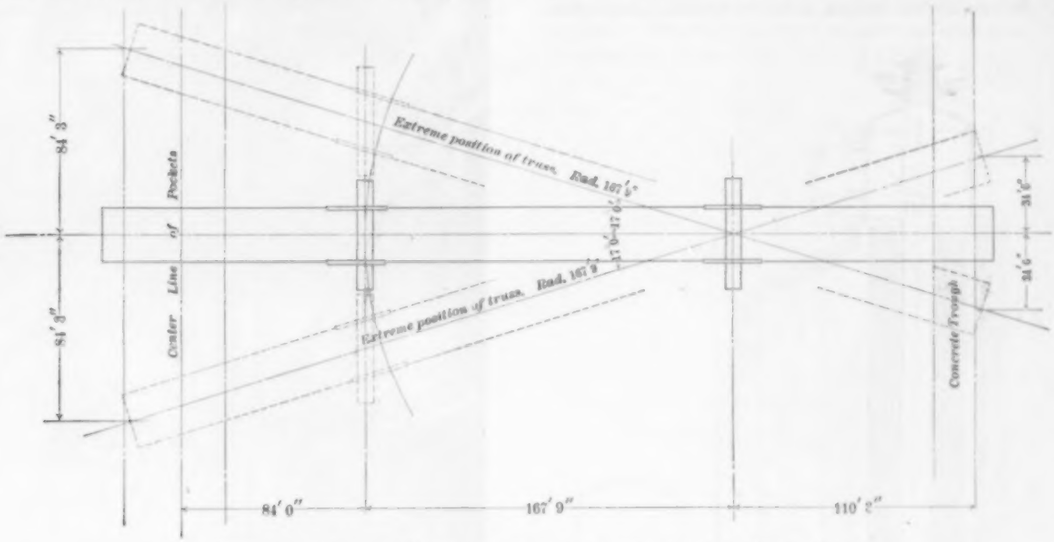


FIG. 6.—DIAGRAM SHOWING EXTREME ANGULAR MOVEMENT OF CONVEYOR BRIDGE.

Ore Handling Equipment and Bin Systen.

Two Hoover & Mason ore unloaders have been installed, each equipped with a 5-ton grab, with a 10-ton grab on the

FIG. 7.—HOOVER & MASON ELECTRICALLY OPERATED SCRAPER IN VESSEL HOLD.

ore bridge. The bridge is 412 feet long and 161 feet between supports, and the overhang is 125 feet. The striking feature of the unloading plant is that it is operated throughout by electricity. Each machine has four 25-h. p. motors on the hoists; they are Westinghouse direct-current enclosed type. Each unloader has a scraper operated by a 35-h. p. motor. On each unloading machine is a 25-h. p. motor for raising the boom and propelling the machine along the track. The electric unloaders are simpler in action and more easily operated than steam ones, this being particularly true of the operation of the scraper. The scraping is under much better control with the electric system. By means of wires, the operator can connect with his motors and at the same time go about at will in the hold of the vessel. A boy goes around in the boat with a light switch strapped around his neck weighing about four or five pounds. The switch is attached to an electric wire which the boy drags around the boat with him. He can in this way keep control of the engine all the time.

The bridge is very similar to that at the South Chicago plant of the Illinois Steel Co. The supporting walls were put in temporarily of timber, the intention being that with the furnace in operation, slag would be available which can be used to make these walls permanent at the convenience of the management. The ore yard is 400 feet long and will hold a stock of 160,000 tons. The bridge controls the entire ore yard and also a large reserve stock of coke and limestone. Provision has been made on the bridge against wild cars

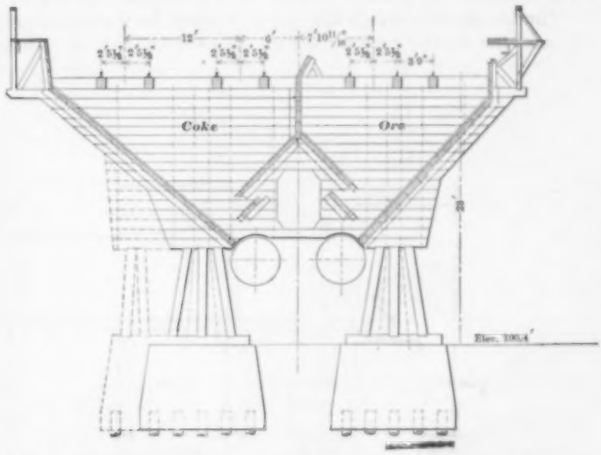


FIG. 8.—GENERAL OUTLINE OF POCKETS OF TIMBERED BIN SYSTEM.

by taking up the shock by friction. The pier walls were founded on piles, and there are 36 piles under the load all the time.

The furnace pockets are built entirely of wood on a new plan. They are of fireproof construction. The pockets are made by laying in crib fashion 12x12 timbers one on top of the other, forming a division between individual pockets. Then the sides and bottom are formed by making a slot or mortise that results in an absolutely smooth surface. The

lumber is all surfaced to dimensions in the mill, so that when it is completed the pocket presents in all respect a smooth surface, and the shrinkage of the timbers goes on uniformly. The Hoover & Mason scale cars, heretofore described, are used to convey the stock from bins to skip cars. The pockets on the coke side have two railroad tracks on which six box cars may be unloaded simultaneously. The wooden pockets are less susceptible to frost than steel, and for that reason no provision has been made for heating them. The practice will be also to keep the bins almost empty in winter. No transfer car is used, as at the South Chicago plant.

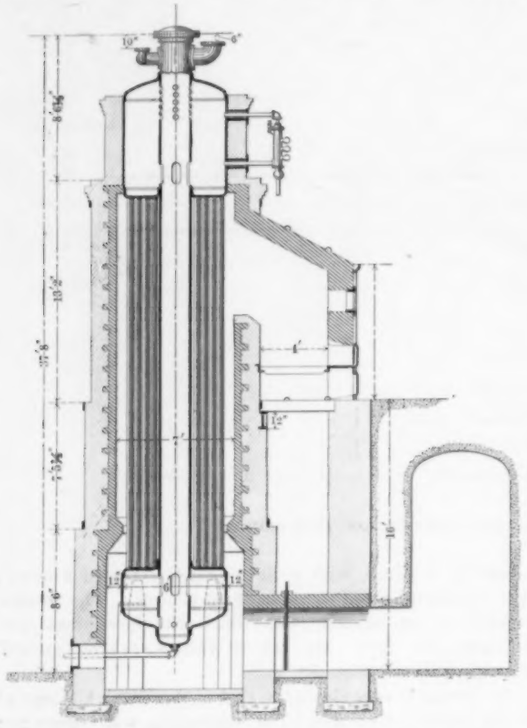


FIG. 9.—SECTION OF WATER TUBE BOILER AND DOWN DRAFT FURNACE.

There are 17 double bins, 17 for ore, 14 for coke and 3 for limestone. Two men are required for delivering the raw materials at the bottom of the double skip hoist—one to load and operate the scale car and another to drop coke and limestone into the skip. A third man is stationed in the hoist house. The skips are operated by a 14x14 double hoisting Otis engine.

The trough into which the ore is dropped by the unloaders is not the costly concrete-walled affair provided at South Chicago. It is a shallow rounded excavation 400 feet long, with 18 inches of concrete on the sides and with steel rails and concrete for the bottom.

The rate of unloading ore by the Hoover & Mason machines varies according to the construction of the boat, the range the past season having been from 65 to 108 tons per machine per hour. On modern boats with good open hatches the average has been about 90 tons per machine per hour. The record of 108 tons per hour was made on the steamer James H. Hoyt on Sept. 1.

Blast Furnace and Power Equipment.

The blast furnace was built after plans of Julian Kennedy, consulting engineer, of Pittsburg, and follows the lines of several foundry iron furnaces built by him. It is 80 feet by 20 feet

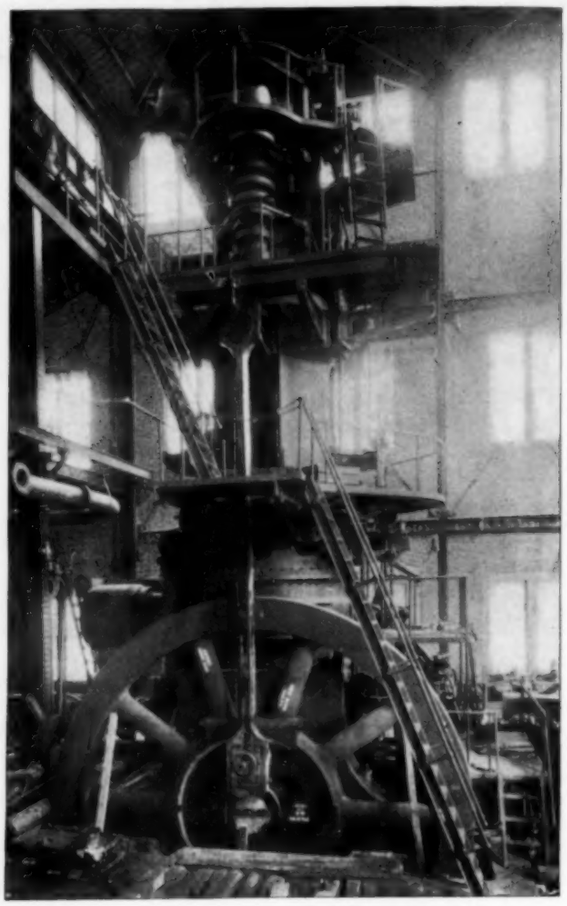


FIG. 10.—WESTINGHOUSE BLOWING ENGINE.

bosh, 13 feet hearth, 13 feet stock line and 9 feet bell diameter. The top is of the Julian Kennedy closed type, without explosion doors, and the bell is operated by hydraulic cylinders working in oil. There are three dust catchers, one large one on the downcomer main and a smaller one each on the boiler

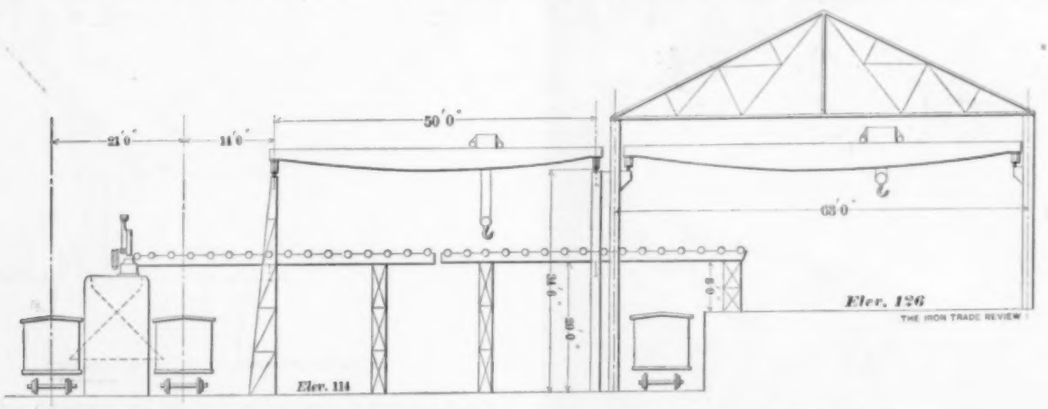


FIG. 11.—SECTIONAL ELEVATION OF CAST HOUSE AND PIG BREAKING TABLES AND HAMMER.

main and the stove gas main. The furnace is built with bosh jacket construction, and is provided with Rader vertical plates and two rows of Scott bronze plates. There are 16 5-inch tuyeres. The furnace is set in a bay of the cast house, the latter being 354 feet long and 63 feet from center to center of columns. Adjoining the furnace is the cinder pit into which hot slag is run. The water-granulated slag is removed by a clam shell operated by a "whirley," which loads it

into cars for railroad ballast. Some experiments are being made looking to the permanent employment of sand pumps to distribute the granulated slag about the yards where needed for filling.

The four stoves are 92x22 feet, and are of the Kennedy type, having central combustion chambers. The fittings include Berg hot blast valve seats, Kennedy cold blast valves and Morrison chimney valves. The central stack for boilers and stoves is 200 feet high.

The boiler house contains 12 300-h. p. vertical water tube boilers, which are an exception to the usual method of using blast furnace gases in having a down draft. The gases are admitted well up on the front through Spearman-Kennedy

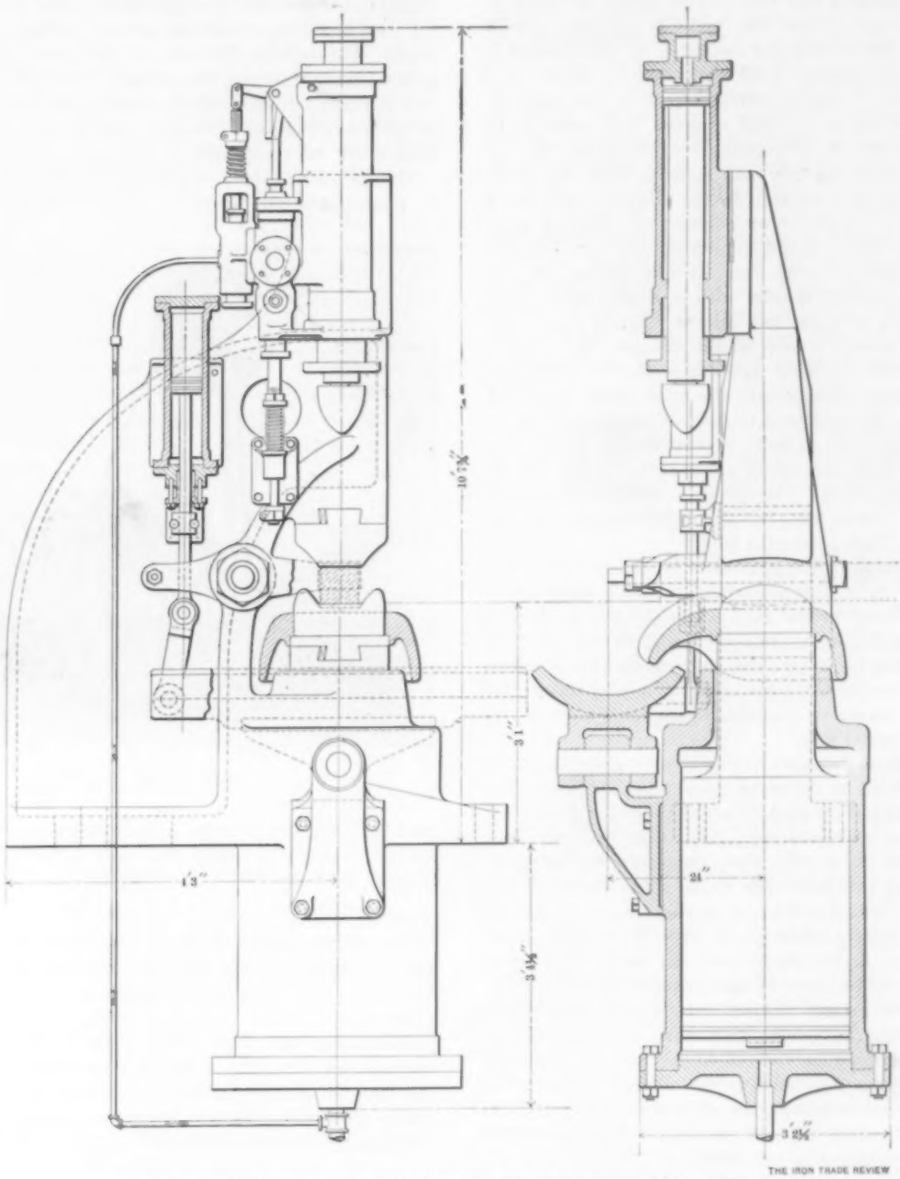


FIG. 12.—SIDE VIEW AND SECTIONAL ELEVATION OF STEAM PIG BREAKER.

burners. Each boiler has 108 4-inch tubes, 20 feet long, and there is one central drum 20 inches in diameter. The tubes are arranged in ranks and not staggered, as it usual. This arrangement gives readier access for replacement and prevents dust accumulations. The down draft dispenses with baffle plates and secures a better diffusion of the hot gases over the tube surfaces and avoids the travel in definite lines noticeable in ascending draft, resulting in hot spots and the rapid burning out of particular tubes. The down draft also gives a deposit of dust in places most convenient for removal.

There are three Westinghouse vertical long-crosshead blowing engines—two high pressure and one low pressure, the latter located between the others. Either high pressure engine may be run with the low pressure as compound, or the two high pressure engines, which are disconnected, may be run and the low pressure remain idle. Ordinarily, one high pressure engine is in reserve. The steam cylinder is above the air cylinder. The high pressure cylinders are 50 inches diameter with 66-inch stroke and the low pressure cylinder is 96 inches diameter with 66 inches stroke. The air cylinders are 96 inches diameter. The engines are provided with a 7,000-h. p. Weiss condenser. The power house contains the three main tank pumps of the Epping-Carpenter type, duplex compound, having 3,000,000 gallons capacity each. There is an intake well just outside the power house, 40 feet deep by 24 feet diameter, connected with the river by a 30-inch cast iron pipe. There is a standpipe 80x16 feet. The We-Fu-Go system of water purification is employed and for boiler feed service there are three Stilwell-Bierce duplex pumps.

The electrical equipment consists of two General Electric 250-k. w. generators, 220 volts, d. c., each driven by a pair of 15x21 Erie City simple engines. The uses of electricity about the plant are varied, as already indicated in part. Electrical power is employed to operate the ore unloaders, also for all the operations on the bridge, for actuating the rollers on the bins, propelling the scale car, for the two cranes at the cast house (one inside and one in the yard), for the 20-ton engine house crane, for driving the roller run on the pig-breaker, for the tools in the machine shop, for the lighting of the entire plant and for the heating of the cabs on the ore handling rigs. This last is accomplished by boxing in the resistances.

A feature of the plant calling for special mention is the pig-breaking, or more correctly the sow-breaking, machine designed by E. H. Williams, general manager. A good idea of its construction and its relation to the cast house is obtained from Figs. 11 and 12. It is carried on an elevated steel structure and consists in the main of skids on which the sows, 30 feet in length and of 6x6-inch section, are deposited by the cast house crane; alongside the skids a roller run on which the sows are carried to a steam hammer by which the breaking is done. The pig breaker table is 94 feet 9 inches long, resembling a rolling mill table and really has two roller runs, the one taking the sow from the cast house and the other, independently driven, carrying it on to the breaker. If the table were made continuous, a sow once started would go direct to the hammer; the two roller runs make it possible to hold the sows on the first in case the operation of the hammer is interrupted for any reason. Each roller run is driven by a Westinghouse 30-h. p. direct current motor of 220 volts located under the rollers on the steel support. The operation of breaking the sow consists of running out, clamping with one cylinder of the steam hammer and striking with the other. The hammer, which was designed by the Morgan Engineering Co., of Alliance, O., weighs 28,000 pounds; its clamping cylinder is 24 inches in diameter and its striking cylinder 10 inches. It breaks the 6x6-inch sows into 15-inch pieces and can break them into 12-inch lengths with a single blow. It is capable of breaking 20 pieces in a minute. As the roller table carries the 30-ft. sow to a stop on the hammer, the operator gives steam to the clamping cylinder with one hand and operates the striking cylinder with the other hand. The iron from the hammer drops into a trough, as shown in Fig. 12, and this is actuated by a cylinder so that the movement of a lever drops the piece through a chute into one car or the other on the tracks below. The operator, with the fracture of the broken piece before him, can decide as between the two cars and to that extent grades the iron.

The yard adjoining the pig breaker is commanded for a length of 250 feet by a 10-ton overhead traveling crane which stores unbroken sows in the yard whenever this is desired, lifting them from the skids alongside the roller run which is next to the hammer. When the time comes for breaking these sows they are lifted by the yard crane and transferred to the skids and thence to the table which feeds them to the machine in the regular way.

In the cast house the sows are generally gathered up in threes to be delivered by the crane upon the roller table. The cast house is so large that there is ample room for storing the 30-ft. sows from a 12 hours' run. The crane will pick them up and put them in a pile after they have cooled sufficiently, permitting the sand beds to be made ready for the next cast. There will therefore be no night work on the pig breaker, and naturally a minimum of labor of any kind in the casthouse at night, as the pig-breaker can break 500 tons of iron in 10 hours. The force of men required about the furnace will thus be greatly reduced. It will be possible to handle all the pig iron on the two turns with seven men. Further economies may be secured in the later development of the system, the proposal being to use a single mold for the molding of the sows in groups, the work being done with the crane. In the preparation of the sand beds a harrow would be used, also manipulated by the crane.

The Toledo Furnace Co. was organized in February, 1902, when the land was purchased at Toledo. Work was begun on May 1, 1902, and the furnace was blown in on May 31, 1903. The perplexities attending construction work last year are well known, but the plant is now well started upon what gives every promise of a prosperous career. It has been well planned, excellently equipped and should give a good account of itself under all conditions of the market.

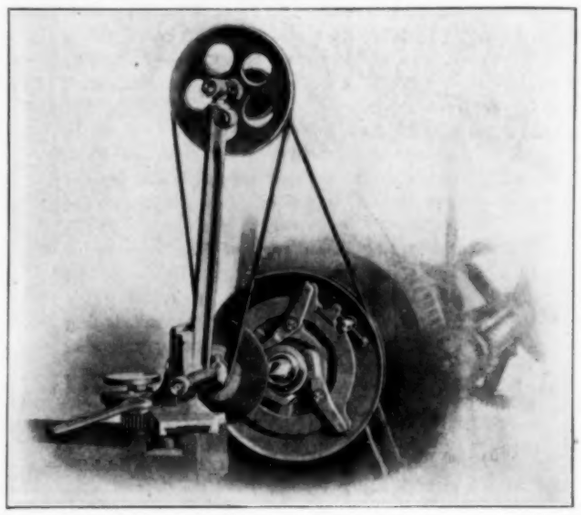
The International Boiler Cleaner Co., Wichita, Kan., recently incorporated, has put upon the market a new boiler cleaner. The machine consists of a series of blades, so placed as to work lightly on the shell of the boiler, moving back and forth by power from a small rotary engine placed on top of the boiler. This scraping movement carries all the loose scale to the back part of the boiler, and is taken out through the blow-off.

MUELLER CENTER GRINDER.

This center grinder can be applied to a lathe in less than two minutes, thereby enabling the operator to keep the hardened centers in perfect condition at all times.

The three-jawed universal chuck pulley, shown in cut, is fastened to the nose of a lathe spindle without marring same, after which the bottom slide of grinder is bolted to the tool block of lathe. In order to grind all centers at a 60-degree angle, the upper part of this slide has a bearing at an angle of 30 degrees to the line of lathe spindle, on which the second slide is placed and operated back and forth by a rack and pinion by means of a lever. The grinder spindle is then brought to a line with the tail stock center, and after placing the two round belts on their grooved pulleys, the grinder is ready. The spindle that carries the emery wheel is taper, ground, has a dust cap, also provision for taking up wear. It will run about 1,600 revolutions when the lathe spindle speed is 250 revolutions, and since the two spindles are parallel with each other, no twist belts are necessary.

This grinder is made very useful for light circular grinding by placing a drum overhead. A rest attachment (shown in cut) is furnished, it being very handy for sharpening saws, cutters, small twist drills, etc. The grinder is made by the Mueller Machine Tool Co., of Cincinnati.



A NEW CENTER GRINDER.

The Hunts-Lyman Iron Co., at Lime Rock, Conn., was $400 in arrears on its taxes at the town of Canaan, Conn., and to liquidate the claim the company has deeded to the town all of its property at that place, consisting of 400 to 500 acres. Fifteen years ago, when the late W. H. Barnum was president of the company, it had a large surplus. Mr. Barnum invested $40,000 in machinery, boilers, etc., which was set up in Huntsville, but was run only a short time. The machinery was recently sold to a junk dealer for $150.

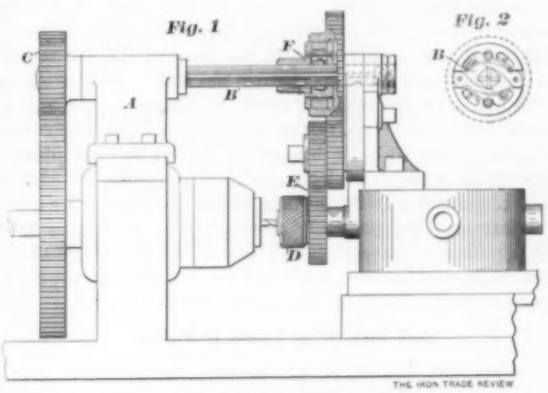
Alfred H. Cowles, president of the Electric Smelting & Aluminum Co., says of the significance of the recent court decision upholding the validity of the Bradley patent on smelting by the use of electricity: "The decision will extend for about three years the patent monopoly of the manufacture of aluminum, as the Bradley patents do not expire until 1909, while the patents owned by the Pittsburg Reduction Co. expire in 1906. The decision is a recognition by the courts of the Bradley patent being the fundamental patent in the enlarging field of electric smelting. This view of these patents was taken by the United States court of appeals in 1897. In 1892 the Cowles Electric Smelting & Aluminum Co. first sold aluminum in the world's markets as low as $1 per pound, but was enjoined by the courts through an action brought by the Pittsburg Reduction Co. for infringement of the Hall patent."

Some New Things for the Shop, Chiefly by Way of the Patent Office.

Improving the Turret Lathe.

A drilling or milling attachment which may be secured to the turret head of a lathe has been patented by Charles Glover of the Corbin Screw Corporation of New Britain, Conn. The purpose of the device is to allow the milling or drilling of work carried by the spindle of the lathe, by merely turning the turret head into such a position that the tool on the carriage may rotate as it is advanced against the work. The means for rotating the tool is automatically coupled with the source of power as long as the tool is being operated and is uncoupled when that particular operation is accomplished. From this it will be seen that the drilling or milling mechanism is disconnected from the source of power when the other tools carried by the turret are being used. There is therefore no unnecessary wear of the parts.

Fig. 1 is a front elevation of a lathe showing the parts involving the invention; a portion of the view is in section. Fig. 2 is a detail view of the clutch mechanism with the end plate removed. Passing over the ordinary features of the turret lathes common to the shop and which for the present purpose need no special consideration, A is a journal mounted on the headstock of the machine and providing a bearing for an auxiliary shaft B. The latter may here be termed the clutch shaft. There is a gear C on the clutch shaft which meshes with one of the back gears and by this means the shaft



SPEEDING UP THE DRILL IN THE TURRET.

B may be rotated from the source of power. It will be seen that in the usual operation of the machine the clutch shaft B rotates continuously but when running idle involves no waste of energy according to the patent papers.

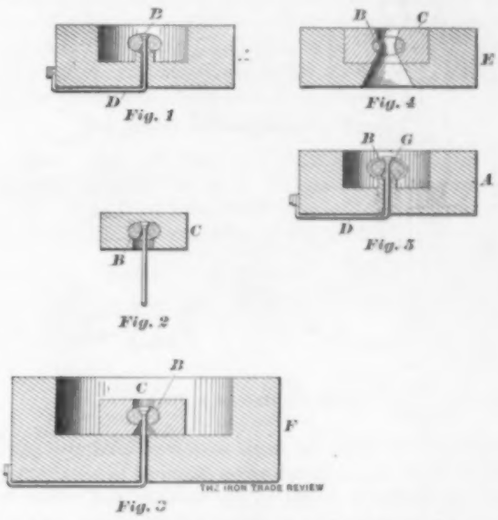
A bracket is fastened to the turret and supports the parts of a drilling attachment. The drill is held by a chuck D and rotates with the gear E and these parts with the connecting gears are mounted on the bracket. There is a clutch F carried at the end of the shaft B, the details of the clutch being illustrated more minutely in Fig. 2. The end of the clutch shaft B is pointed in order to readily enter the clutch F and engage the cam levers.

Of course the main feature of the contrivance is in the possibility of speeding up the work. It will be understood that the gear ratios may be such that the spindle carrying the work rotates at a certain speed suitable for the other turret operations, and the speed of the drill can be so much in excess that it will effectively cut the holes required. The direction of rotation is of course a matter of indifference from the patent point of view and the speed of the drill is proportioned by the aid of the gears to the purpose desired. Any number of these attachments may be employed corresponding to the usual turret positions.

The Making of Draw Plates.

Draw plate making is no novelty to the toolmaker of wide experience but the drawing of very fine wire involves some peculiarities of treatment which are suggested by a recently issued patent to Frederick Krause of Jersey City, N. J. The invention relates to the formation of diamond draw plates and the process is exhibited in the following illustrations: Fig. 1 shows a mold with a diamond in place; Fig. 2 shows the diamond incased with steel or iron. The method of casting further material about the article is seen at Fig. 3 and Fig. 4 shows the enlargement as cast. A modification of the process is presented at Fig. 5.

In the illustrations a mold A is shown with a perforated bottom. A diamond already drilled is placed in the mold and a wire D extends through the hole in the diamond B to hold it securely in the temporary position. The molten steel or iron is then poured into the mold and surrounds the diamond, the latter sitting on a slight elevation above the bottom of the mold. The steel or iron when cold is removed from the mold as indicated at Fig. 2. At the under side of the stone which rests on the seat in the mold, the iron and steel casing or shell C leaves the hole in the diamond B exposed. At the opposite side the casing C is bored out to form an opening communicating with the perforation in the diamond. The wire D which serves to hold the diamond in place when it is cast around with metal, is removed when the casing is bored.



THE CASTING OF IRON AND STEEL WITH DIAMONDS.

The plate can now be employed for wire drawing but in order to facilitate the handling of the tool it may be enlarged by forming a casting E about the casing C. This enlargement can be cast by placing the plate as seen at Fig. 2 in a mold F and holding it in position with a wire, as already shown. The perforations in the diamond are plugged with graphite, clay, or some similar substance, after the wire D is in place, to prevent the metal from flowing into the cavity when the casing is made. The enlargement is bored out to free the opening as was done in the first instance.

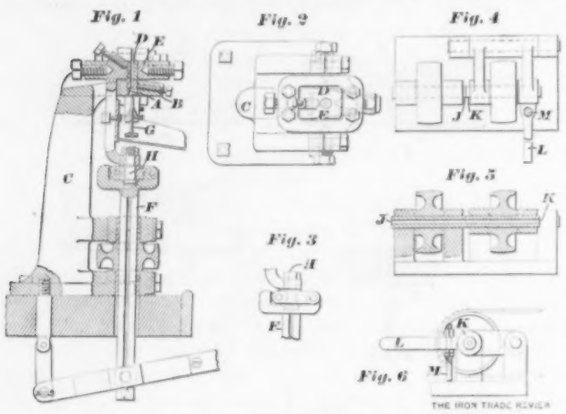
The danger of injuring a diamond during these operations will be apparent to anyone who has undertaken to handle these easily chipped crumbs of carbon for industrial purposes. The inventor does not overlook this or the possibilities involved, and says plainly that the heat during the casting operation may injure the diamond. He advises the wrapping of the diamond with sheet metal. This procedure is indicated at G in Fig. 5 and the retaining wire there illustrated has a head which cannot slip through the opening in the diamond when the shank is passed through the wrapping and the stone. During the casting of the part C the wrapping G is supposed to shield the diamond from molten steel, immediate contact is prevented anyway, and the wrapping becomes alloyed or fused with the casing so that when the draw plate is complete the encased diamond appears as illustrated in Fig. 2.

Rod Cutting Contrivances.

Curtis H. Veeder, of the Veeder Mfg. Co., of Hartford, Conn. has an interesting patent on a process which had almost seemed to have reached the acme of simplicity. The cutting of rods appears about as primitive a matter for patent application as any metal cutting operation whatever and to afford very limited scope for the exercise of the inventive faculty. Nevertheless Mr. Veeder has produced a decided novelty and thereby attains the unexpected in the simplest of metal working operations.

It is well known that when rods, bars, or wire generally, are cut off or sheared by the ordinary methods there is likely to be more or less distortion of the ends of the wire close to the cut and that frequently a fin or burr is left projecting. When the wire is used in long lengths, the amount of labor necessary to restore the ends to their proper shape or to remove the fins, etc., is not of any great importance and common methods of cutting will suffice. When, however, the wire is to be used in many short lengths the value of the labor required to finish the ends bears an unduly large ratio to the value of the finished part.

The object of the patent is the production of a machine which shall be capable of cutting off wire, rods or bars, either of round or other cross section without materially distorting the ends and without leaving a fin. For obvious reasons the machine is intended to operate at great rapidity and at the same time obtain the other advantages. A single cut in one



THE CUTTING OF RODS.

direction only is liable to cause distortion and the machine under consideration is therefore so designed to shear progressively from different points of the wire or rod. Two bushings are arranged to have a cutting action on the wire which is passed through them, one of the bushings having a rolling motion with gradually increasing eccentricity with respect to the other bushing. The bushings, however, and this is the crucial feature of the invention, have no movement of rotation about the wire other than the rolling action already mentioned. The bushings may have a rotary movement if the wire or rod has also a movement of rotation about its axis but not otherwise.

The invention finds expression in its simplest form when the wire and the bushings rotate at the same angular speed, but in most instances it is not practicable when handling the wire or rod in long lengths to let it rotate about its own axis, and in such cases the bushings are restrained from rotation and have only the relative rolling motion necessary to secure the progressive shearing action.

Fig. 1 is a vertical section through such a machine, the co-operating bushings having no movement of rotation about their own axis. Fig. 2 is a plan view of the device and Fig. 3 illustrates the links which work the rocking bushing. Figs. 4, 5 and 6 are respectively a plan view, a longitudinal section and an end elevation of the invention when the bushings are adapted to rotate with the wire, rod or bar to be cut.

Taking first the machine illustrated in Figs. 1, 2 and 3, the bushing A is shown as threaded in an arm B of the standard C and secured by a setscrew. The co-operating bushing D is held from turning about its own axis but is mounted in the gimbals and capable of displacement witih respect to the axis of the bushing A. To attain this end it is threaded in a block E and secured by a setscrew. The block E is supported in gimbal frame by pivot screws and has an arm which extends down through an opening in B and is turned at right angle to engage a pin H. This pin is connected by links with the head of a shaft F. The shaft F is arranged to have an endwise movement as well as a rapid rotary movement, the pulley by which it is driven being mounted between projecting brackets of the machine frame and engaged with the shaft F by a sliding key and spline. A lever supports the shaft and effects the endwise movement. There is an adjustable stop for regulating the length of the pieces cut and a trough may be attached to the arm as shown in order to discharge the cut-off lengths of wire away from the line of the shaft F.

The bushings A and D with diameter suitable to the size of the wire, having been placed in their respective holders, the wire or rod is fed through them until the end rests against the stop G. The shaft F is now in its highest position as illustrated in Fig. 1, it is rotated rapidly and at the same time moved gradually downward and away from the fixed bushing. When the shaft F is in its highest position the pin H is in alignment with the shaft F as well as the bushings A and D, but the shaft is moved downward from the bushing A, the action of the hinged block and the links, Fig. 3, will throw the pin G to the side and thus the bushing D is forced out of alignment with the shaft. The eccentricity of the bushing D with respect to the bushing A will be gradually increased and as the shaft F is continuously rotated at a high speed the working edge of the bushing D will act successively at different points around the circumference of the wire until the latter is severed.

In the modification of the invention shown in Figs. 4, 5 and 6, one bushing J rotates in fixed bearings while the other bushing K is mounted in bearings which are capable of transverse movement with respect to the axis of the bushing J. The bearings may be supported by the arms of a swinging frame and provided with an operating handle L and an adjustable stop M. With this arrangement of the mechanism the wire rotates with the bushings J and K and at substantially the same angular velocity. When the bushing J is shifted out of alignment with the bushing K and the eccentricity gradually increased, the point of shearing of the metal progresses with a rolling movement. The action of the two forms of the machine is therefore the same and the relations of the bushings to each other and the wire substantially identical.

Tool Holders for Lathes or Planers.

The peculiar feature of the design here described, which more than any other entitled the contrivance to patent office protection, is not any too apparent, but letters patent have

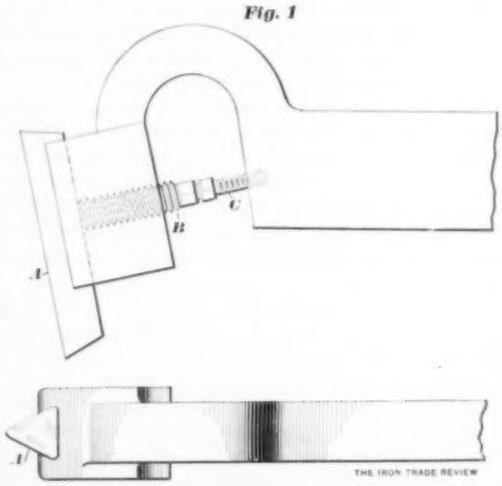


Fig. 2

TOOL HOLDER SIMPLICITY.

been regularly issued to Joseph Brandsteter of Salem, O. The insertion of a block into the hollow of a goose neck tool as occasion may demand a less elastic condition, is an expedient that would occur to the average mechanic as readily in the course of his labors as the picking up of any tool whatever

would follow closely on the heels of the need and that without inventive effort. The substitution of a couple of screws as means of adjustment with the triangular cutter may dignify the design to the extent of invention but the difference is not an obviously ingenious one.

The tool holder is seen in elevation and plan in Figs. 1 and 2. The inventor points out that spring cutters are frequently forged from bars of steel and are correspondingly expensive, an argument which is in favor of tool holders generally. The tool holder comprises a bar having at one end a spring head or goose neck that at the depending and free end merges into the slotted holder for the cutter. The arched portion is proportioned in the usual manner so as to spring slightly at the free end when strain is applied to the cutter. The tool A engages in the dovetail slot and a setscrew B bears against the cutter and projects backward to meet a jam screw C threaded into a hole in the shank of the tool holder.

It will be seen that when the jam screw C is forced against the setscrew B, these bolts act as a stiffening brace and convert the tool holder into a rigid bar.

A Lathe Attachment.

The adaptability of that really universal tool, the lathe, brings to light from time to time various attachments intended

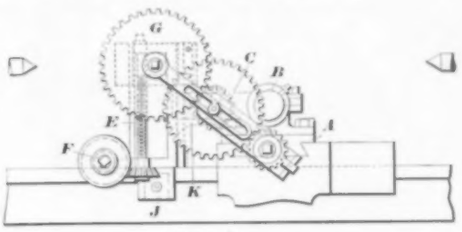


Fig. 1

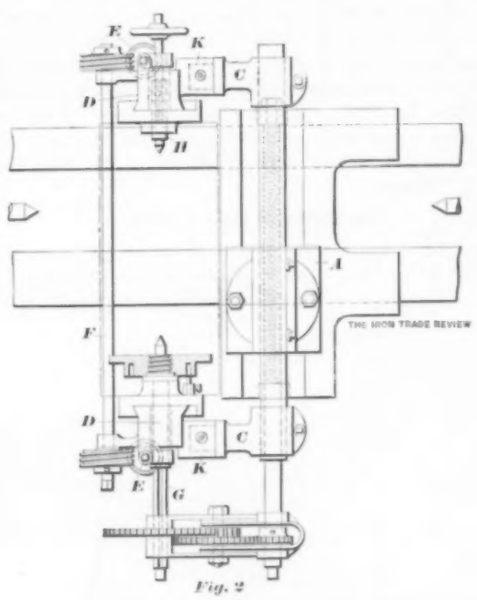


Fig. 2

A LATHE WITH MILLING ATTACHMENT.

to give the machine even greater digestive capacity. That the planer, milling machine, press drill and the like have their especial fields of service is not to be denied but there are few if any machine tool operations incapable of fulfilment on the lathe. The attempt to have that tool, however, handle machine shop work for which other tools are particularly appropriate is inept to the last degree and lias no excuse beyond the one of insufficient means, too little machinery or money. Under the stress of circumstances lathes will be arranged to do milling and other things but that attachments of this kind will be commercially profitable is questionable under any but the condition specified.

John Wright of London, Eng., proposes to adapt the lathe for performing a number of operations which have usually been done on a milling machine—cutting the teeth of gears, fluting reamers, taps, twist drills, etc.—and also provides a means for drilling or boring work. He attaches to the bed of the lathe or the saddle a frame capable of adjustment in various directions; for this purpose the ordinary slide rest is removed. Fig. 1 is an elevation of the apparatus and Fig. 2 is a plan.

The usual slide A which is traversed across the saddle by a screw has upon it a block in which is fixed a spindle B and to the ends of this spindle are fastened arms C. To the outer ends of these arms C are pillars D with V-shaped guides for the slides. The slides are moved by screws E and connect with worm wheels and worms carried by a shaft F supported in arms projecting from the pillars D. The rotation of the shaft F causes the simultaneous movement of the screws E and the slides.

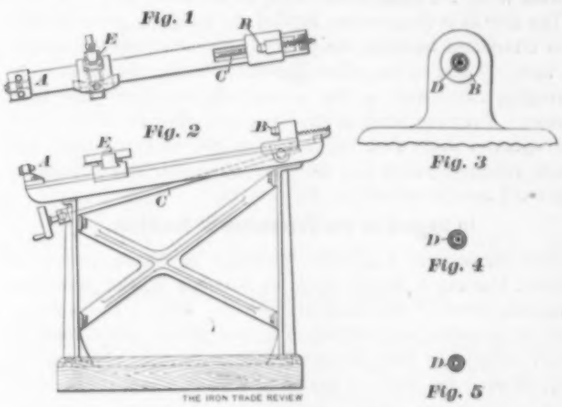
A spindle G is carried by one of the slides and is also threaded for a face plate and the other end of the spindle is adapted to the application of a series of change wheels. The other slides supports a tailstock and center H capable of adjustment in the usual manner. The milling cutter is mounted on an arbor carried on the lathe centers.

Provision is made for working an article which cannot be conveniently held between the centers. A bed or table is arranged between the slides as indicated by the dot and dash lines in Fig. 2. The work may be fastened on the table in any usual manner and raised and lowered with the table by rotating the shaft F as already described.

It is necessary in some cases to support the work above the lathe centers and for this purpose the pillars D are formed with sockets J at their lower ends. These sockets are similar to the sockets K which normally support the pillars upon the arms C. By removing the sockets K from the arms C and applying the sockets J and then by loosening the spindle B in the clamp and rotating it until the arms C are perpendicular the desired result will be obtained.

The Matter of Straightening Tubes.

There are tubes and tubes and corresponding methods of straightening them. The more delicate the work the more closely we get back to hand operations. For this reason, the economy required, the necessity of straightening tubes where



THE CORRECTION OF TUBES.

some degree of accuracy is demanded is met by greater restrictions in the preceding processes of manufacture. Thus the errors are avoided by increased care at earlier stages.

The manufacture of small arms is in a class which does not so readily permit this earlier insurance against inaccuracy. The bore of a rifle is long and of small diameter and the tendencies to error many. The method of testing for faults in tubes patented by Messrs. Driver and Murray of the Birmingham Small Arms Co., of Birmingham, England, will be found of interest therefore.

The ordinary system of testing the bore of a gun barrel for straightness involves the pointing of the tube at a window or other lighted opening. At the top of this opening is fitted a blackboard having a straight lower edge. On looking through the barrel when it is pointed a few inches below the edge of the blackboard, a shadow or shadows will be observed along the lower part of the bore commencing at the end nearest to the light and extending as far back as the middle of the barrel. The observer rotates the barrel while looking through the

bore and by the shape or outline of the shadow he is able to judge whether the bore is straight or otherwise and the location of any faults or distortions that may occur. As will easily be understood a method of this kind is dependent for its success upon the skill and judgment of highly trained workmen.

The attempt at a reduction of the difficulties involved is along the following lines: The tube is extended in an oblique direction at the source of light, the projecting upon the wall of the bore annular bands of light and shade, the effect and intensity of the light bands being heightened by contrast with the alternate shade bands. Thus the appearance presented to the eye of the observer looking along the bore from the back end is that of a continuous series of alternating luminous and dark rings, circles of black and white lying one within the other for a considerable distance along the bore. Each ring corresponds to a known portion in the length of the barrel when the tube under test is true throughout. When the barrel is rotated and the walls are not parallel at any part of the bore then the particular light or dark band which corresponds to the position of the fault will appear to be eccentric relatively to the other bands and the exact point of the error in the circumference determined.

Fig. 1 is a plan view of one form of combined barrel testing and correcting machine and Fig. 2 is an elevation. Fig. 3 represents upon an enlarged scale, an end view of the forward hollow center in which the light screen is fitted. One form of screen for admitting alternating rings of light and shade is shown in this view fitted into the hollow or axial opening in the center and two other forms of screen for producing similar effects are illustrated in Figs. 4 and 5.

There is an inclined bed plate supported upon braced standards, and provided at the upper and lower ends with hollow centers A and B. The barrels are held between these centers which are capable of adjustment for different lengths of tubes. The adjustments as well as the grip and release of the barrel under examination may be effected by a traversing screw C attached to the under side of the bed and provided with a hand wheel. A spring fastened to the headstock steadies the motion while the centers are under adjustment.

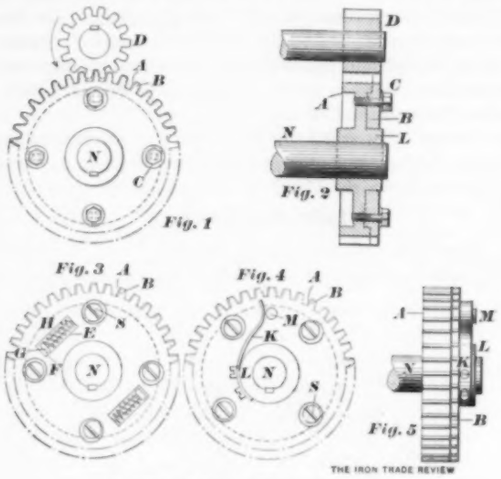
The disc D is fitted to the bore of the forward center so that it is interposed between the bore of the barrel and the source of light. There is an adjustable press E for the purpose of springing the barrel at the points where a fault has been located. Pressure being applied to the wall of the barrel until the operator finds that the whole of the rings of light and shade reflected within the bore are concentric and remain so when the tube is rotated on the centers.

In Regard to the Prevention of Backlash.

The *Mechanical Engineer* illustrates a recent patent of Messrs. Darling & Sellers, Ltd., of Airedale Works, Keighley, England, which is described as follows: Figs. 1 and 2 represent an elevation and section of a spur pinion and compound wheel which has been designed with a view to eliminate all play between the teeth of engaging wheels, whereby the tendency of the driven wheel to lunge forward on being momentarily released from its load, with the consequent objectionable noise and wear and tear of the teeth, is avoided. To one side of the spur wheel A is mounted a toothed checking disc B of the same diameter and form of tooth as wheel A. This disc B is prepared to fit on the boss of wheel A and is adjustable in a rotary direction. It is secured to the wheel A rigidly by screws C after the adjustment of the checking disc in position so that the backs of the teeth of the checking disc B are in contact with the backs of the teeth of the engaging pinion D. Thus the wheel A and disc B constitute a compound wheel, and by the teeth gearing with those of a simple wheel D, in such a manner as to fill up any clearance space which there would otherwise be between the teeth of the driver and driven wheels, a solid rolling contact of the teeth with or without load is assured, and by being adjustable the wear of the teeth may be compensated and solid rolling retained.

Instead of rigidly securing the toothed checking disc B to the wheel A by screws C, the disc may be attached to wheel A by screws S, Fig. 3, constructed and applied in such a manner that the checking disc is free to rotate a certain distance, and the backs of the teeth of disc B and those of engaging wheel D are automatically held in contact by spiral springs E of sufficient strength, as shown in Fig. 3. Slots F are cut through the plate of checking disc, and to the wheel A rigid stops G are secured in position to project into the respective slots F. A guiding pin H extends from each stop G, and around each pin is placed a spiral spring E compressed between the stop and end of slot as shown, by which the toothed checking disc B is forced in the direction so that the backs of the teeth of the disc are automatically held in contact with the backs of the engaging wheel.

In place of applying spiral springs, as in Fig. 3, the backs of

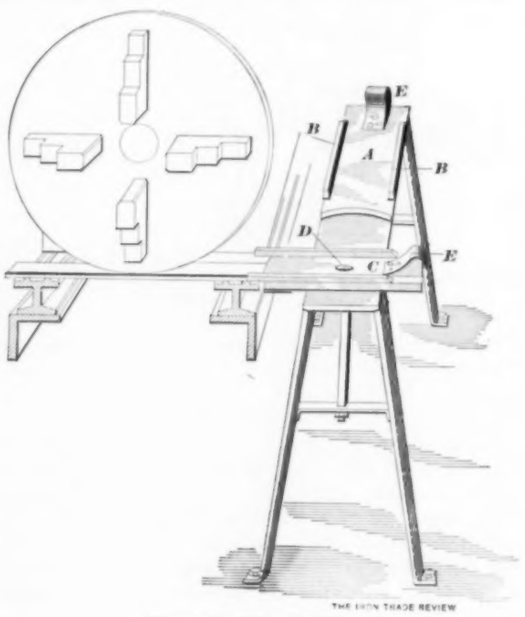


BACKLASH PREVENTION IN GEARS.

the teeth may be kept in contact and insure solid rolling by applying a curved plate spring K of suitable strength, applied in the manner as shown in Figs. 4 and 5. The spring is secured to the boss L of wheel A, and the other end adapted to engage with a stud M secured to the movable checking disc, so that by the spring pressure, the checking disc is automatically operated in a rotary direction, and the backs of the teeth held in what is practically solid rolling contact, thus preventing the driven wheel lunging forward whenever the load is momentarily released.

The Lifting of Lathe Chucks.

Who that has had the experience of handling a heavy chuck about a lathe will fail to be interested in any project for improvement there? A recent patent granted to Charles E.



THE HANDLING OF CHUCKS.

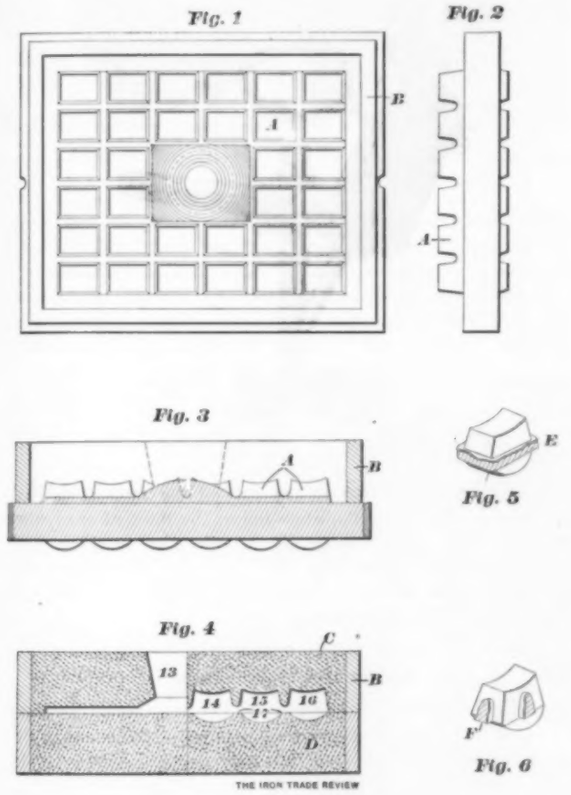
Thiebaud, of Duquesne, Pa., is in this direction and so far is commendable. The device consists of a stand running parallel with the lathe bed and having a swiveled plate to rotate and

receive the chuck when it is run off the spindle and then turns to permit the chuck to be rolled behind the headstock out of the way.

The illustration presents a perspective view of the practical application of the contrivance. A block A adjacent to the shears has rails B on the top which form a guideway for the rolling of the chuck. This guideway does not extend to the forward end of the block and on that portion in advance of the rails is the turntable C with a recess on the upper side for the head D of the swivel. There are buffers E at the rear end of the block A and the forward end of C. Nothing apparently in the way of having the stand high enough to avoid the necessity for any packing under the chuck and no special reason given why the turntable could not extend at least halfway across the lathe bed but any help at an awkward job is not to be despised.

The Making of Castings.

William D. Sargent, of Chicago, has devised a plan of making brake shoes in particular and castings in general which is said to make a considerable saving. He says: "I have found that this new method of making castings effects a saving in the formation of brake shoe inserts amounting to as much as thirty and a half per cent." And this is not the usual hasty estimate of saving from invention introduction where percents



CASTING MANUFACTURE.

are freely scattered but "by records taken from actual shop practice."

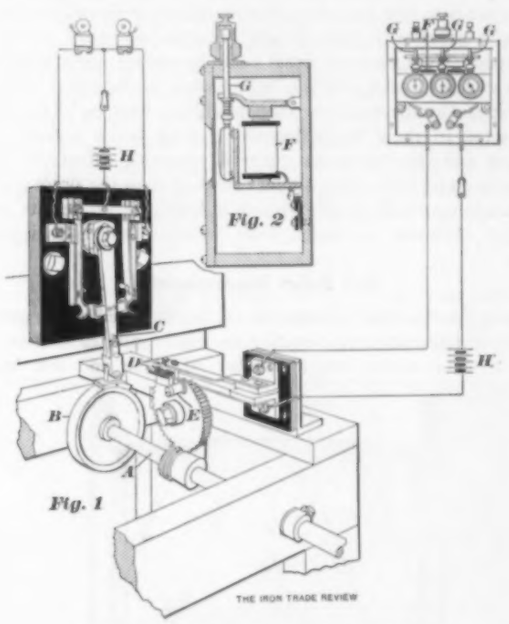
The scheme differs from the ordinary method of forming a number of castings after a like pattern in this respect: Instead of the several castings being attached to a common gate or sprue, the castings themselves act as gates for the metal so that there is no single casting which is not directly connected with at least one of its neighbors. On the other hand and for the same reason, the metal is run in from several or all of its sides at once.

The object of the invention is to reduce the flask room as well as the waste material which is lost in the gates or sprues and has to be remelted to again become of service. Fig. 1 represents in plan a molding flask with a pattern designed for use in carrying out this invention. Fig. 2 is an end view of the patternboard and Fig. 3 is a sectional view through the flask and pattern. Fig. 4 is a sectional view through the mold after it has been formed, the view being taken on two different lines, a different section being shown on each side of the center line. A perspective view is shown in Fig. 5 of a brake shoe made in accordance with the terms of this invention. Fig. 6 presents another method of forming the connection between the castings.

The individual patterns A are secured to a plate and on this is placed the flask B. The sand is rammed and the half mold C thus formed is turned over and the pattern removed. The half mold D is made in the same way. When the two molds are put together the chambers for forming the inserts will appear as in Fig. 4. One of the inserts is seen at Fig. 5 and has a ragged flange E extending clear around it, caused by breaking the insert away from its neighbor in the casting. This flange is very thin and the connection may be formed in any one of a number of ways. Fig. 6 illustrates at F where the castings may be connected by means of narrow necks instead of a continuous web.

Keeping Track of Machine Movements.

Bradley A. Fiske, of the United States Navy, has invented an indicator for determining at a distance the speed and rotative direction of a shaft. Fig. 1 is a perspective view of the signal transmitting mechanism with the circuits and signal receiving device shown in diagram. Fig. 2 is a sectional view of the direct reading speed indicator. The shaft A has a disc B



RECORDING THE MOVEMENT OF MACHINERY.

mounted eccentrically, the amount of eccentricity may be very slight—say ⅛ inch. Immediately above the disc is a lever C capable of sliding vertically a short distance and having at the lower end a shoe, the latter being engaged by the disc B. As the shaft rotates to the right or the left the arm is moved to the one side or the other at each revolution through the agency of the eccentric. Contact springs are mounted at each side of the lever C, each set of springs controlling a circuit which includes a bell or other signal receiving device. A battery H provides the energy for ringing the bell on either the right or the left according to the direction of rotation of the shaft. The bells can be different in tone and of the single stroke pattern. A switch is placed conveniently near them and the sound not only indicates direction but affords an opportunity to count the strokes for number of revolutions.

The direct reading indicator consists of a pair of springs at D to control the circuit, these springs are closed by a pin E on a worm wheel which is geared to a worm on the shaft. The contact points D carry insulating studs which ride on the pin E. The studs rise together and then the upper spring falls on the lower one. To accomplish this, the stud carried by the upper spring is cut away on the lower edge. Contact is always made at exactly the same position of the worm wheel regardless of the direction of rotation.

The speed indicator for direct reading consists of three

stop watches operated simultaneously by an electromagnet F included in the circuit. Springs are interposed to reduce the shock to the watches and the latter are mounted upon a bar of soft iron to shield them from the magnet. A rod G extends up through the case and is attached to each watch for winding purposes. As is well understood pressure upon the knob of a stop watch does one of three things. It stops the watch hand if the hand is turning, it returns the hand to zero if the hand is stopped at any point other than zero, and it releases the hand and starts it to rotating if the hand be stopped at zero. It makes no difference when the pressure on the knob ceases provided it ceases in time to give the next impulse. The three watches are set in different phases—one watch hand is stopped at zero, another is in motion and the third is stopped at the position where it was when the electromagnet was last attracted. One of the three watches therefore indicates the speed at which the shaft was running during the last sixty seconds.

The above device was intended in the first instance for an engine shaft but there are other adaptations of course. In fact electrical devices for keeping tab on machinery are becoming common as the advantages are understood. A printing office for example has a system of electric lights in operation for the purpose of showing which of the presses are in actual operation, the speed at which they are running and to what extent the throw-offs or trips are being used. The lights are in a row just above the manager's desk and the press room is practically right before his eyes and very much in evidence. Two pieces of brass come in contact every time the press closes to print and the light flashes in the office. Other machines (in the machine shop possibly) may be electrically connected to show the difference at long range between an air cut and the legitimate material removing effort. In the meantime and until some simpler method than the present one of watching results is discovered, a keen eye on results will be less obtrusive in action than watches and incandescent bulbs.

Belt Pulley Improvement.

George A. Ensign, of Defiance, O., has patented a belt pulley which is illustrated in elevation in Fig. 1 and in section in Fig. 2. The pulley has a number of right and left hand

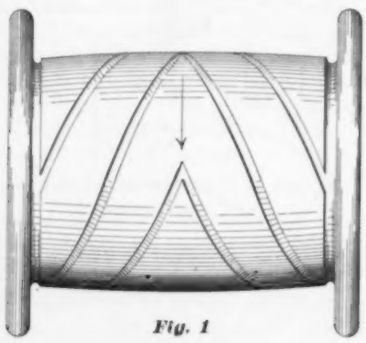


Fig. 1

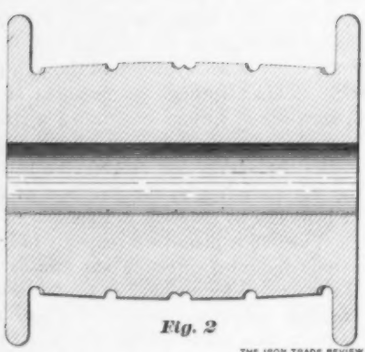


Fig. 2

THE SURFACE FINISHING OF PULLEYS.

grooves cut in the surface and these run in pairs from a starting point in the direction of the arrow, that is in the direction in which the pulley is turned. The grooves are run around the surface for a half turn only so that the air can escape readily and will at no time be locked by the belt surface. The grooves are of the same pitch and tend to keep the belt on the center of the pulley. The pulley has evidently been designed for the high speed requirements of wood working machinery.

A PORTABLE ELECTRICALLY DRIVEN DRILL.

The demand for a portable electrically driven drill of larger capacity than the hand drills, made by the Hisey-Wolf Machine Co., of Cincinnati, has encouraged the firm to put out the tool here illustrated. The drill has an "Old Man" attachment and has a drilling capacity up to 7/8 inch.

This drill has a 7-inch feed by means of a hand wheel. The drill spindle is fitted with ball bearing thrust and will hold a No. 2 Morse taper shank. The "Old Man" has an adjustable extension of 20 inches in any direction, so that the tool is a universal radial drill. The weight is 95 pounds as set up ready for work. The extreme height, as illustrated, is 30 inches over all.

The drill has two speeds, changeable by means of a small lever on the front end of the motor, and is under complete control of the operator at all times, as a switch is provided to stop and start the machine. Power may be obtained from the ordinary incandescent lamp socket, but the current must be direct. The standard windings are for 110 and 220 volts, although motors are wound for special voltages as desired. The usefulness of the drill will be readily recognized, as it

THE "HISEY" ELECTRICALLY DRIVEN SCOTCH DRILL.

may be taken to the work in any part of the shop or carried any distance on outside requirements to the limit of cord connection. One man can easily handle the machine and there are no belt connections of any kind. The motors are the manufacture of the Hisey-Wolf Machine Co. and are built especially for this class of work.

LaBelle Iron Works Bonds.

LaBelle Iron Works, Steubenville, O., has issued circulars to its stockholders announcing the intention of the board of directors to issue $2,500,000 of five twenty-year 6 percent gold bonds, dated Dec. 1, 1903, interest being payable semi-annually; $100,000 of these bonds to be selected by lot, to be paid and retired at par and accrued interest each year, beginning Dec. 1, 1908, the company having the privilege of paying and retiring thereafter, on thirty days' notice, or any interest bearing dates, further amounts of said bonds at 105 and accrued interest. The bonds are to be secured by a first mortgage on the real estate of the company located in Ohio and Brooke counties, W. Va., and in Jefferson county, O., and by the stock of the Pitt Iron Mining Co., holding the company's ore lands in Minnesota and the LaBelle Coke Co., holding the company's coking lands in Pennsylvania, which stock is the property of the LaBelle Iron Works. The actual cost of these properties, according to an audit made on July 4, 1903, was $6,582,069.77. Since that date new and additional construction has cost the company $310,982.43. The value of the personal property of the company is placed at $3,083,467.62, and the total assets, as shown by the books of Sept. 30, 1903, were $9,782,629.63. In view of the fact that recent stock subscriptions were taken at a premium of 10 percent, the board of directors decided that the stockholders shall have the privilege of subscribing for these bonds at 90 percent of their par value.

A NEW DIVIDING HEAD.

The illustrations, Figs. 1 and 2, show a new dividing head for standard and differential indexing, which will give the series of whole numbers from unity up to 380 and with the spindle in any position from the horizontal to the vertical.

The differential indexing is obtained by connecting the

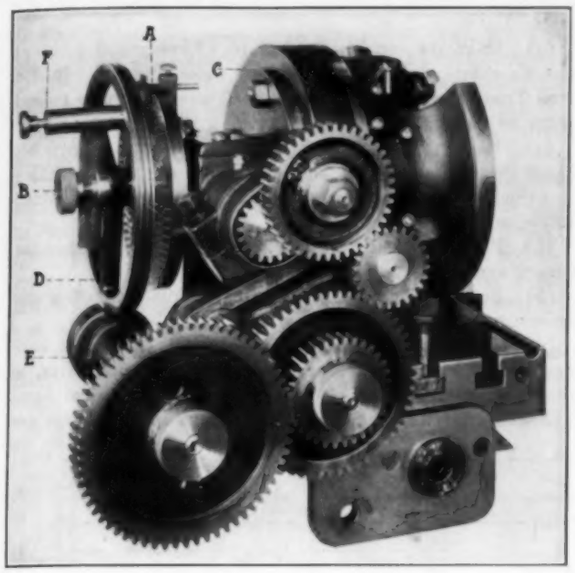


FIG. 1.—SHOWS THE HEAD SET FOR 107 DIVISIONS. A IS GRADUATED TO 180 DIVISIONS.

index plate A and rotating it in a certain ratio with the crank shaft B. The crank shaft B is connected to the spindle, by means of a worm, in the ratio of 40 to 1, and consequently 40 turns of the crank F are required to rotate the spindle once. If the index plate A is now turned with the same ratio as the spindle and in the same direction as the crank F, with 40 turns of the crank F the crank will pass a certain hole in the index plate A 39 times only. This results in the spacing of 39.

If the index plate A is turned in the opposite direction of the crank F the plate gains one hole, the crank F makes 40 revolutions, but the spacing number is 41. The rule given by the makers of the device shown is as follows: If the index plate rotates in the same direction as the crank, subtract the turns of the plate to one turn of the spindle from the turns of the crank to one turn of the spindle and the remainder will be the spacing number. If the plate rotates in the opposite direction to the crank, the spacing number will be the sum of the turns of the plate to one turn of the spindle, added to the turns of the crank to one turn of the spindle.

The swivel head is fitted into the frame with a taper shank and by means of a clamping plate C and nuts is held in position. A dividing plate I, with 24 divisions for quick spacing, is fitted to the front of the spindle and the index pin is operated by a crank J and the whole is enclosed and protected from injury. When the quick spacing device is used, the worm is disengaged from the spindle by means of an eccentric bushing, which may be re-engaged by pushing against a stop without adjusting.

The crank shaft B has a worm D secured to the outer part which engages a worm wheel on a spindle running in a bracket E screwed to the frame. The index plate A rides loose on the crankshaft B and is connected by proper gearing with the table screw (for cutting spirals) and with the worm wheel spindle for differential spacing. The index plate A is graduated on the face for the purpose of setting the sector to the desired distance by *degrees* instead of counting the number of holes. A table is furnished for this purpose.

For standard indexing requiring delicate adjustment of the spindle, the index plate can be rotated by means of the thumb screw L in the back of the index plate, as shown in Fig. 2. When the head is employed for standard dividing the bracket E can be readily removed by taking out one screw only.

The head swings 11 inches, the front end of the spindle is threaded and has taper hole corresponding to that of the machine. The spindle may be locked without throwing it out of alignment. The tailstock has a 2-inch vertical adjustment.

The device is manufactured by the Oesterlein Machine Co., of Cincinnati.

The Wm. B. Scaife & Sons Co., of Pittsburg, manufacturer of the Scaife and We-Fu-Go systems for softening and purifying water, has appointed C. A. Malan, of the City of Mexico, its sole representative in that republic for the sale of its various systems for this purpose. This company is now manufacturing every type of water purifying systems, intermittent or continuous, treating the water either hot or cold. Its apparatus is now softening and purifying 350,000,000 gallons of water daily for steam boilers and other industries where pure soft water is desirable.

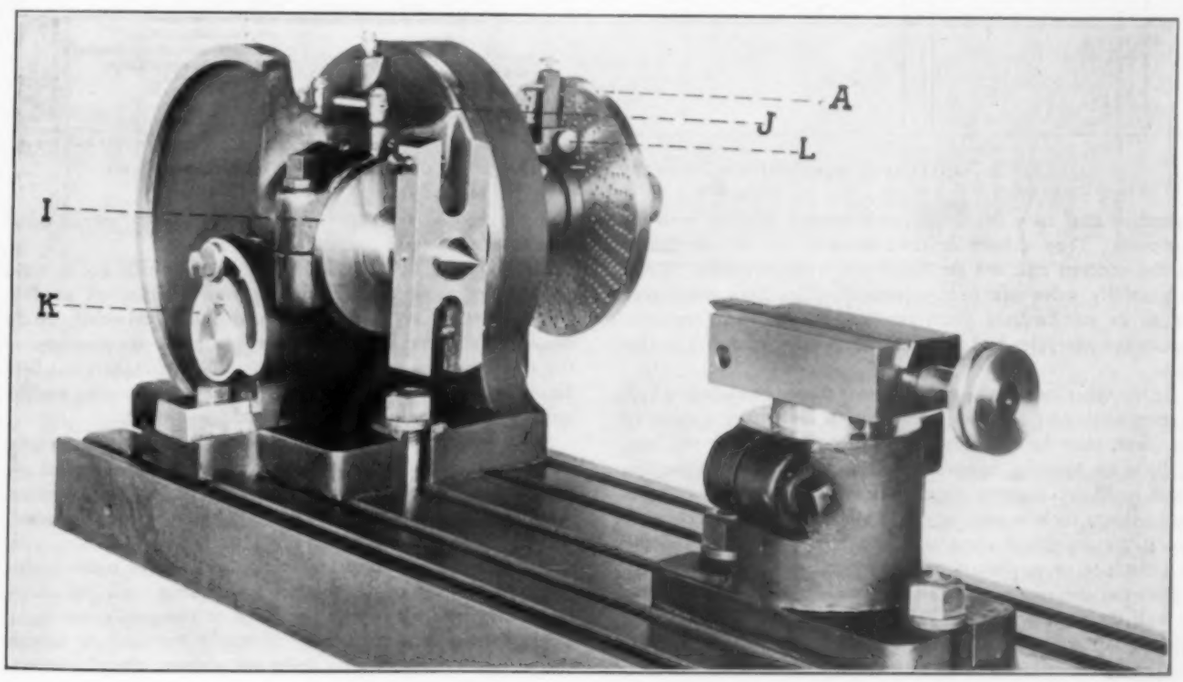


FIG. 2.—A IS GRADUATED ON FACE TO 180 DIVISIONS AND I TO 24 DIVISIONS.

The Use and Abuse of System.

BY JOHN CALDER.

At the present time when business methods and apparatus, particularly those of engineering concerns, are being so closely scrutinized and proposals made towards securing, if possible, a machine-like regularity in every department, it is well to bear in mind that a system, like the plant itself, is worth no more than it can earn. All money, brain friction and worry expended beyond this point are thrown away. Dead uniformity and absence of scope for individual initiative are not necessarily factors in securing what are the sole justification for special outlay on system—economy, accuracy and dispatch in sales, manufacturing, shipping and installation.

Systems are necessarily as various as the business conditions which have to be met. The simplest condition is that of a concern manufacturing a thoroughly standardized product which, under no circumstances, will they adopt or modify for occasional special use. Here at one sweep many of the troubles which afflict the management of general engineering concerns are disposed of and attention can be concentrated upon a limited number of definite problems, the satisfactory solution of which may be attained by gradual and experimental stages.

In plants in which standardization and a manufacturing basis of business can be carried to an extreme, the shops and executive staff have practically no necessary relation with the customer. They deliver finished material to the warehouse of the concern and the problems which their system should successfully solve are purely internal. The light machinery trades in standardized contrivances, such as cash registers, typewriters, bicycles and various fittings, are embraced in this class.

At the other end of the scale, we may have business in which a complication of agencies, some within and many outside of the plant, must be skillfully tied up to each other by red tape, as little as possible, however, if they are to produce the desired result by a given time. These problems of successful management include such trades as shipbuilding, or mechanical operations dependent upon civil engineering work proceeding at a distance, or combinations of contracts.

Between the two extremes there are all possible variations, no half dozen of which could be safely managed on the same system. In concerns in which system is an expensive hobby and not an economical tool, all kinds of extravagances will creep in, both in clerical expenses and handling apparatus.

At one plant, the writer recalls a dictum of the president that no part of the product was to be moved by manual labor under any circumstances. To comply with this, at a machine forging pins, a mechanical ladder elevator was proposed, which was to remove the pieces as fast as they were forged. Result: Each bucket would have contained one pin. The actual solution of the writer was a very commonplace but despised one, viz.: a stout Irishman with a wheelbarrow, detached from a regular task, for five minutes twice a day.

There are several rules in regard to office and shop routine which the writer would recommend managers to observe, irrespective of the class of work done:

(1) Have a system definite and business-like in all departments.

(2) See that a broad view of the subject is taken and provision made for properly dovetailing the departmental systems.

(3) Make the connection clear to all concerned by using graphic charts, for instance, such as those illustrated in *The Iron Trade Review* of Aug. 6, 1903. These save many tedious pages of explanation.

(4) Have as *little* system and as few forms as possible. Make them a means, not an end. There are many needless items which are perpetuated, on card indexes and business forms, today, in some systems.

(5) Prune and pare the system till it gives economy, accuracy and dispatch in sales and manufacture.

(6) Be always on the outlook for improvements but discriminating in adopting them.

In estimating the net financial results of a system of business and shop routine, it is convenient and suggestive, at times, for managers to place the facts in a graphical form. The writer has found this method a much more fruitful one than poring over the pages of a ledger with their intricate and disconnected details.

Net price from factory

Material cost as billed	Cost of procuring and handling material.		Men's labor cost as per daily time card.		Departmental labor charges.		General expense charges.	
	No.	Item	No.	Item	No.	Item	No.	Item
	10.	Cartage and ferriage.	35.	Direct charges.		Fixed Expense.	1.	Experimental.
	11.	Feed purchased.			18.	Insurance.	2.	Paymaster.
	12.	Delivering material to shop.			20.	Taxes.	3.	Errors in drawing.
	13.	Stores department.			32.	Depreciation.	6.	Telephone.
	16.	Stores office.			33.	Power.	7.	Building repairs.
	17.	Purchasing department.			34.	Interest.	8.	Stock repairs.
	22.	Freight and lightering.				Variable Expense.	9.	Photo. and blue print dep't.
	27.	Shipping department.			4.	Breakage and spoiled work.	14.	Stationary purchased.
					5.	Extra work on poor castings.	15.	Inspection.
					26.	Tool supply purchases.	19.	Pattern repairs and additions.
					29.	Tool repairs, oiling etc.	21.	Order dep't.
					30.	Foremen and non assignable labor.	23.	Factory office.
							24.	General yard labor.
							25.	Proportion of officers salaries.
							28.	Superintendent's dep't.
							31.	Drafting.

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FIG. 1.—ANALYSIS OF ITEMS WHICH MAKE UP NET FACTORY PRICE FOR A CERTAIN VOLUME OF PRODUCT.

Fig. 1 shows an analysis of the items which go to make up the net factory price for a certain volume of product. Fig. 2 shows a graphical analysis, in numerical order, of the amounts of these items, which go to make up expenses of the shops for the same production. The latter chart has been framed to represent a low volume of business and the resulting difficulties with establishment expenses.

Scattered usually through the bookkeeper's folios, such data, collected at considerable expense, is massed to satisfy the annual audit; charted systematically, however, in a few moments, weekly and monthly, it is most suggestive to the factory manager and proprietors.

If the more intelligent of our labor leaders could realize the expensiveness of the absolutely necessary brain and executive ability which precedes the labor of the people too exclusively termed "the workmen," it would do much to educate them upon the economic folly of strikes. Only with the greatest reluctance does the manufacturer jeopardize his capital by maintaining a general staff and its continual expense during enforced idleness, or low output, caused by labor trouble. It is never in his interest to decrease in the least the comparative volume of item 35—wages directly chargeable to individual orders—the relative size of this sum being a measure of factory prosperity.

It will be noted that the value of the raw material does not enter into the factory price for comparison purposes, as the

increments of value, due to handling from start to finish, are taken care of under their respective heads.

It will also be seen that the section-lined items on the chart, Fig. 2, are those which remain practically constant in any given organization and are a heavy proportion of the total factory expense of production; while a number of the other items do not decrease pro rata with falling output—or direct charges No. 35.

An examination of the chart shows in practical detail how the factory business as an organism suffers from not being used to its fullest capacity, leaving out of account altogether the losses on the sales side through maintaining a staff without sufficient product to handle.

That efficient system in manufacturing plants and offices will become more and more a vital trade factor can be seen by a brief consideration of trade statistics as now available from the U. S. Manufacturing Census of 1900. These show that proprietors expect to make on the average about 20 percent profit on their capital, however much it may be watered, and the enormous dilution of capital that has come into fashion in forming consolidations will render it more and more difficult to keep up the above rate.

Thirty-three years ago—in 1870—the decennial census showed that the capital required to produce a given quantity of manufactured goods was only 50 percent of the normal output. In 1890 the capital required had risen to 70 percent and in 1900 it had further risen to 75 percent. In the latter year $600,000,000 of capital in the iron and steel industry produced products valued at $800,000,000. At the present day, therefore, the capital of a manufacturing concern can be turned over only once in nine months instead of every six months as it used to be thirty years ago. In the United Kingdom, the capitalizations of which appear to be less watered, a turn over of capital twice a year appears to be below the average return, and continental Europe also shows up favorably in comparison.

This is not as it should be considering the great ability brought to bear upon American trade. There is no doubt that the real working capital, if known, would make a better showing for U. S. management but it is worth while inquiring if we get full value at present from the systems in vogue.

The heavy capitalizations and large plant facilities so dominant during the boom period are not satisfying stockholders at present and will be the first to be affected during a decline.

The rationale of system in practical work is, besides operating the factory economically, to anticipate such fluctuations, to measure up carefully the prospective value and desirability of extensions of plant to check mere bigness of project and endeavor by taking stock of future and less favorable conditions, and to make reasonable provision for a contracting expense of organization in place of the fits of promiscuous "firing out" and "shutting down" which characterize some kinds of establishments and class them amongst speculative, rather than solid concerns.

The Standard Oil, Steel Corporation, Westinghouse and other similar show plants with their magnificent organizations and economies are not at all typical of the average manufacturer whose returns bulk largely in the census. Many managers and proprietors are still to be found who have the vaguest ideas as to the relative amount of the expense items which go to make up the net factory cost of their products. This deprives them of intelligent criticism. In some cases the actual outlay to produce the goods is unknown and they are still further removed from a helpful review of results in comparison with expenditure and facilities.

Often where the facts are recorded, it is in such an inaccessible form as to be useless for frequent and rapid reference. It is sometimes urged, in all seriousness, that the detailed data cannot be trusted, but this is simply a plea for slovenliness, which the occasional users would not tolerate in their own technical spheres. It is just as easy and cheap to collect—almost automatically—correct figures, as it is to record inaccurate ones, and the man who knows exactly what he is doing will always come out ahead of his competitor who only thinks he knows.

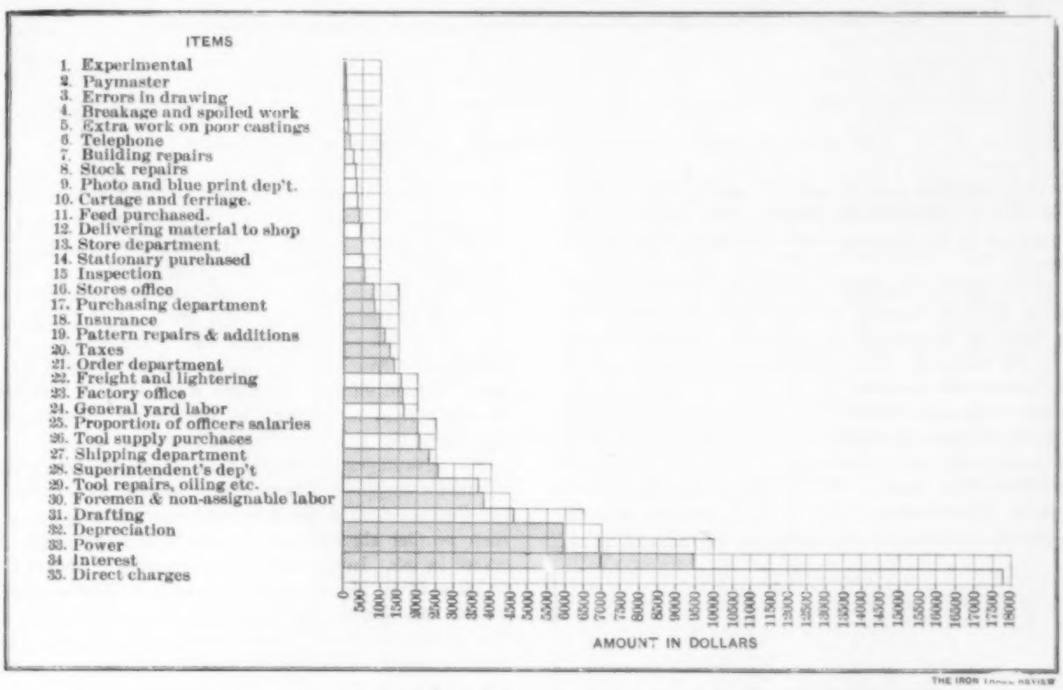


FIG. 2.—GRAPHICAL ANALYSIS OF EXPENSE ITEMS FOR SAME PRODUCTION.

It is a hopeful portent also that the manager is no longer too busy to look at the details of factory accounts. They have become, when properly presented, exceedingly interesting and suggestive documents and the amount of system which we need bids fair to amply justify itself, particularly in lean years, by its results.

The rest is dead weight and should go promptly overboard.

The brass foundry of the Pennsylvania railroad, at Altoona, Pa., has been shut down for an indefinite period.

A Modern Drawing Room System.

BY MARCELLUS REID.

This subject has been given considerable attention by some very able men, and if the writer can add anything of interest, the object of this article will be fulfilled.

To begin with, a perfect drawing room system should be universally applicable to all machine building or manufacturing establishments where a drawing room is used. It is perhaps regrettable that no standard system is universally used, for the advantages of such a system must be apparent to those who have anything to do with drawing rooms. Yet the difficulty of establishing such a system is well known to those who have tried to establish any system. This system I have devised and put in the drawing rooms of several manufacturing concerns.

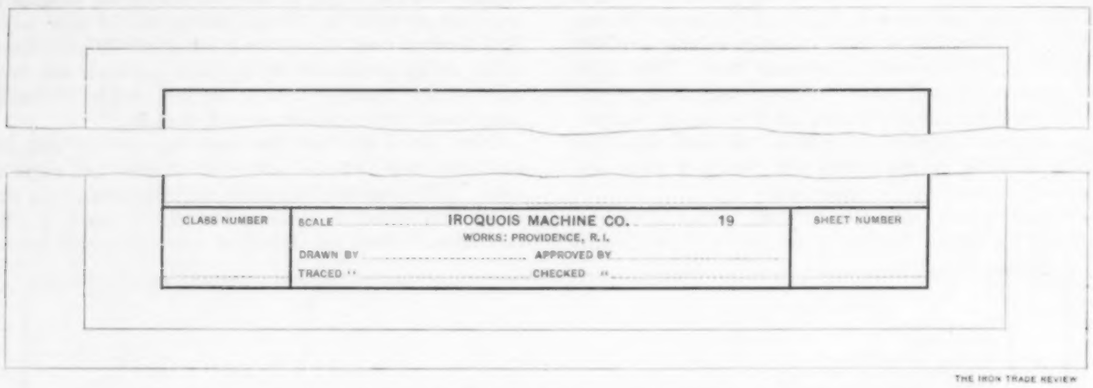


FIG. 1.—ARRANGEMENT OF A 24X36 INCH SHEET. THE MARGIN IS 1⅛ INCH WIDE.

First, in designing a machine, or piece of mechanism, it is laid out on ordinary drawing or detail paper in pencil lines only, as large as convenient, without any reference to the placing of the different views with relation to each other or with relation to their position on the sheet of paper. Practically all the designing is done before any details are made and for this sheet of paper no standard size is used, as this sheet is never traced and is not intended to be taken out of the drawing room. The standard sheets adopted are multiples of 24x36 inches. This I believe to be the best and most economical size for all purposes. The sizes used are 24x36 inches, 12x18 inches, and 9x12 inches. The reason for this subdivision will be apparent when it is understood that practically all machines are composed of one or several large parts, such as frames, etc., and a number of small parts; therefore I leave out the 18x24 inch size, which could be made from a sheet 24x36 inches. Thus I successively cut each drawing sheet, the narrowest way, to make the required standard sizes, but in fact only cut the blue-prints to these exact sizes, for I prefer to allow a small margin outside of the outer border or cutting line, on the standard sheets, for fastening the sheets to the drawing board. All of these sheets are printed as shown.

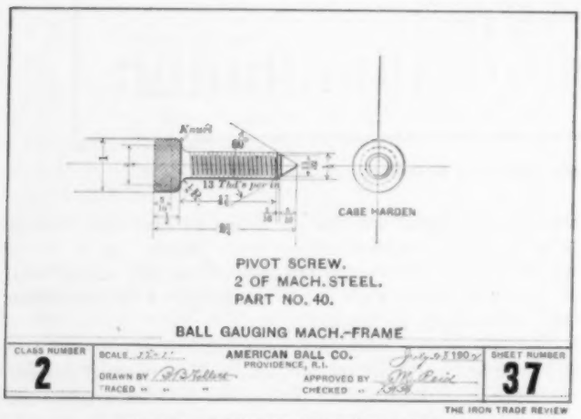


FIG. 2.—A 9X12 INCH DETAIL SHEET.

(Fig. 1 is a reproduction from a typical sheet, the outside line indicating the edge of the paper and illustrating the width of margin, etc. The marginal lines are equally spaced, 1⅛-inch wide on a 24x36-inch sheet. The 9x12-inch sheet has an inch margin on the upper edge of Fig. 1 and a 12x18-inch sheet has an inch margin on the left side, the narrow margin is ½-inch wide on each size of sheet. Fig. 2 is from a 9x12 blue print. The engraver failed to indicate the extension of the paper print beyond the limit of the lines enclosing the drawing and title. A margin extends around the print when trimmed from the form seen in Fig. 1 and cut to the limit set by the second line of the border.)

The most important feature of all systems is that but one drawing sheet should contain but one piece or detail, with the exception of general drawings, which I always make on the 24x36 inch sheets. For all the 24x36 inch general drawing sheets, I prefer to use Byron Weston's or Crane & Co.'s drawing paper, about No. 55. The drawings on these large sheets are always made in pencil lines only, and then tracings are made in the usual way. All drawings or details made on the 12x18 inch and 9x12 inch sheets are inked in and blue-prints made from the drawings. No. 21 Crane & Co.'s bond paper is used entirely for these small sheets. The flexibility of this system is obtained by the use of these small sheets containing but one piece or detail on each sheet.

The advantages of this are most apparent when it is desired to make changes or discard certain pieces; for in the first case the changes desired are penciled in on the original sheet and then another sheet is placed over it and the whole detail is traced in ink. In that way a new drawing is always provided, in place of an altered drawing, which is always more or less soiled, and the old one is used for a record. I have found this system to work satisfactorily, as it is always easier to trace a single detail than to make very much of a change in the same.

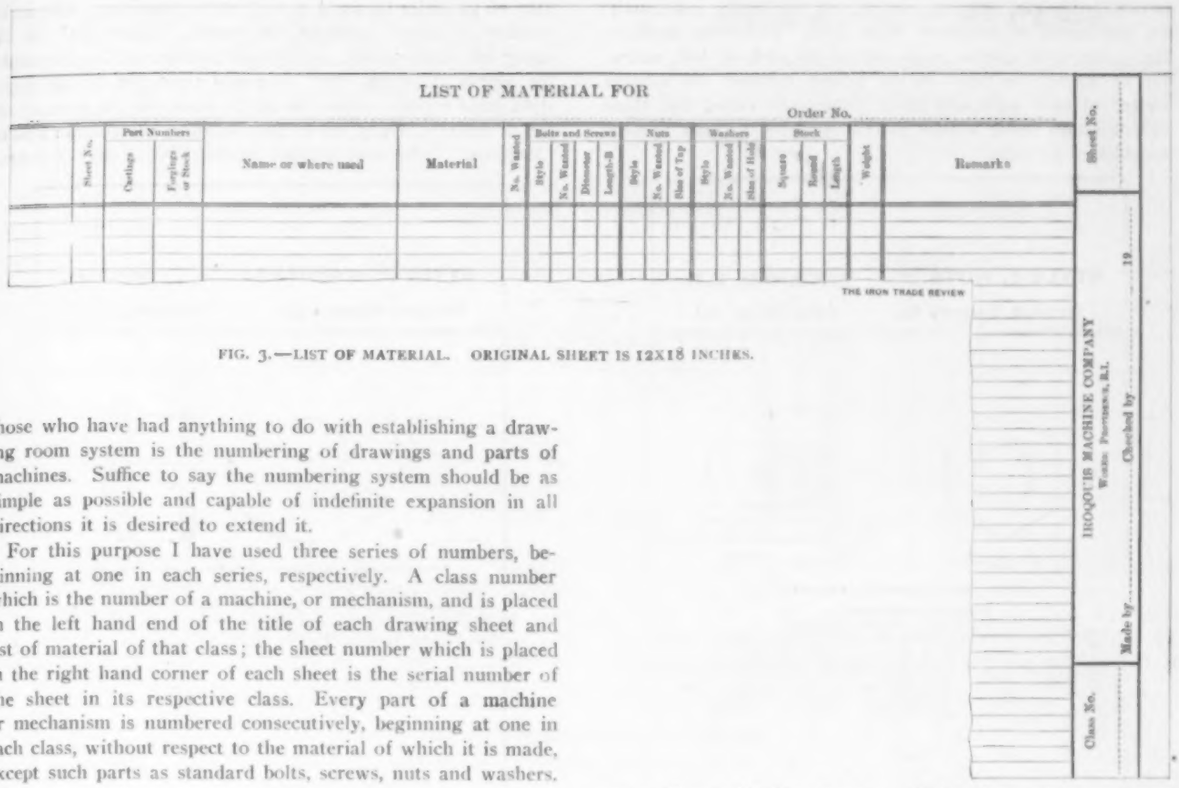
Having the drawing sheets printed as shown in Figs. 1 and 2, has the special advantage of having perfect uniformity in size and style of printing of the title of the drawings, and in placing the whole title across the end allows the most economical use of the sheet.

The margin between the cutting line and border line on all the drawing sheets is one-half inch, except on one side of the 12x18 inch and 9x12 inch sheets, which is one inch wide. The object of this wide margin on the small sheets is to provide means to hold the drawings and blue-prints from the same, in book form, in loose leaf, spring back covers or order holders, such as manufactured by Ruble Brothers, No. 346-348 Wabash Ave., Chicago. I have had these loose leaf holders or covers made special size to suit the 12x18-inch and 9x12-inch sheets.

The list of material, and what I call the Bill of Material, is probably the most important part of this drawing room system.

The list of material is a part of, and in fact is numbered as, one of the drawings in every set of drawings of a machine, or mechanism. A blank sheet for this list of material is shown at Fig. 3. These sheets are printed just as shown and have a margin at the top for holding them in a holder in book form, the same as the other drawings of this size are held.

A subject which has received no small consideration by


LIST OF MATERIAL FOR

Order No.

Sheet No.	Part Numbers: Castings	Part Numbers: Forgings or Stock	Name or where used	Material	No. Wanted	Bolts and Screws: Style	Bolts and Screws: No. Wanted	Bolts and Screws: Diameter	Bolts and Screws: Length-B	Nuts: Style	Nuts: No. Wanted	Nuts: Size of Tap	Washers: Style	Washers: No. Wanted	Washers: Size of Hole	Stock: Square	Stock: Round	Stock: Length	Weight	Remarks

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Sheet No.

IROQUOIS MACHINE COMPANY
Works: Providence, R.I.
Made by ..... Checked by ..... 19..

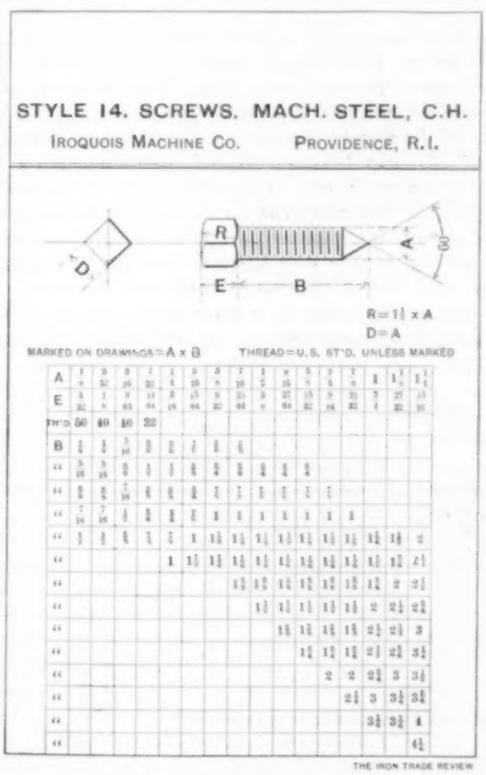
Class No.

FIG. 3.—LIST OF MATERIAL. ORIGINAL SHEET IS 12X18 INCHES.

those who have had anything to do with establishing a drawing room system is the numbering of drawings and parts of machines. Suffice to say the numbering system should be as simple as possible and capable of indefinite expansion in all directions it is desired to extend it.

For this purpose I have used three series of numbers, beginning at one in each series, respectively. A class number which is the number of a machine, or mechanism, and is placed in the left hand end of the title of each drawing sheet and list of material of that class; the sheet number which is placed in the right hand corner of each sheet is the serial number of the sheet in its respective class. Every part of a machine or mechanism is numbered consecutively, beginning at one in each class, without respect to the material of which it is made, except such parts as standard bolts, screws, nuts and washers, etc.

Referring again to the list of material, Fig. 3, the sheet numbers are placed in the first column under the head of Sheet No. The next two columns contain all the part numbers. All parts for which patterns are made are placed in the second column without respect to the material of which they are made. The numbers of all other parts made from forgings


STYLE 14. SCREWS. MACH. STEEL, C.H.

IROQUOIS MACHINE CO. PROVIDENCE, R.I.

R=1½ x A
D=A

MARKED ON DRAWINGS=A x B THREAD=U.S. ST'D. UNLESS MARKED

A	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2
E	3/32	1/8	9/64	11/64	3/16	15/64	9/32	21/64	3/8	27/64	15/32	9/16	21/32	3/4	27/32	15/16
THD.	50	40	40	32												
B	1/4	1/4	5/16	3/8	1/2	1/2	1/2	1/2								
"	5/16	5/16	3/8	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8					
"	3/8	3/8	7/16	1/2	1/2	5/8	5/8	3/4	3/4	3/4	3/4	3/4				
"	7/16	7/16	1/2	1/2	5/8	5/8	3/4	7/8	7/8	7/8	7/8	7/8	7/8			
"	1/2	1/2	1/2	5/8	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2
"					1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2
"								1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/4
"									1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/4	3
"									2	2 1/8	2 1/4	2 3/8	2 1/2	2 3/4	3	3 1/4
"										2 1/4	2 3/8	2 1/2	2 3/4	3	3 1/4	3 1/2
"											2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4
"												3	3 1/4	3 1/2	3 3/4	4
"																4 1/2

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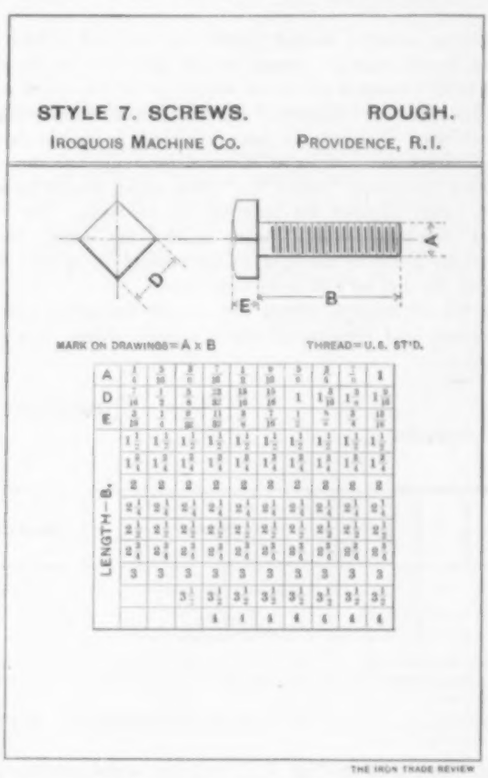
FIG. 4.—ORIGINAL SHEET IS 6X9 INCHES.

name of material for all parts; sixth column, the number of pieces for each machine.

The next four columns are under the head of "Bolts and Screws;" next three columns under the head of "Nuts;" next three under the head of "Washers;" next three columns under the head of "Stock." Referring again to the columns under "Bolts" and "Screws," the first column is headed


STYLE 7. SCREWS. ROUGH.

IROQUOIS MACHINE CO. PROVIDENCE, R.I.

MARK ON DRAWINGS=A x B THREAD=U.S. ST'D.

A	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1		
D	7/16	1/2	5/8	23/32	15/16	1 5/16	1	1 5/16	1 5/8	1 15/16	
E	3/16	1/4	5/16	11/32	3/8	1/2	5/8	3/4	7/8	1	
LENGTH—B.	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	
	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	
	2	2	2	2	2	2	2	2	2	2	
	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	
	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	
	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	
	3	3	3	3	3	3	3	3	3	3	
			3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	
				4	4	4	4	4	4	4	

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FIG. 5.

or stock of whatever kind, are placed in the third column; these two columns being under the head or part numbers.

The fourth column under the head of "Name or Where Used," contains the names of parts as given on the drawings. The fifth column under the head of "Material," contains the

"Style;" under "Nuts" the first column is headed "Style," and under "Washers" the first column is headed "Style."

For all classes of bolts, screws, nuts and washers, and in fact all small parts which can be kept in stock, I use lists of styles as illustrated in Figs. 4, 5, 6 and 7. These styles for

screws, bolts, etc., may be carried out practically indefinitely, but one series of numbers being used. Referring again to Fig. 3, the style number representing the style of bolt, screw, nut or washer, is filled in the proper column, the number wanted of each style and other dimensions called for, these style numbers being always placed opposite the part number in which it is used.

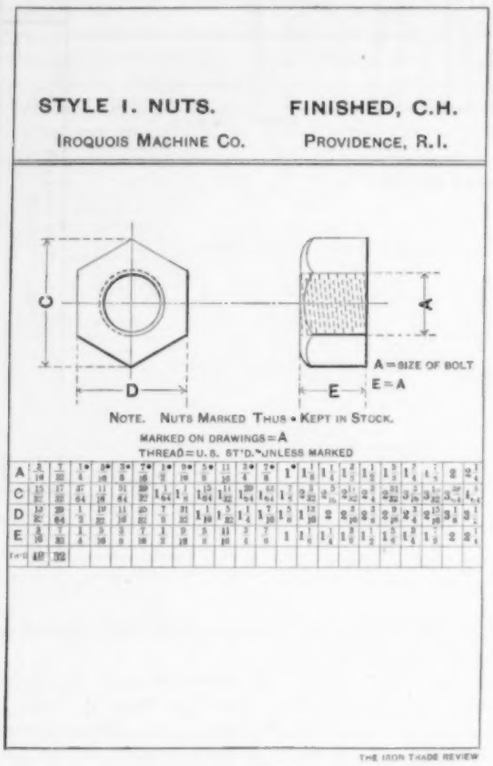

FIG. 6.

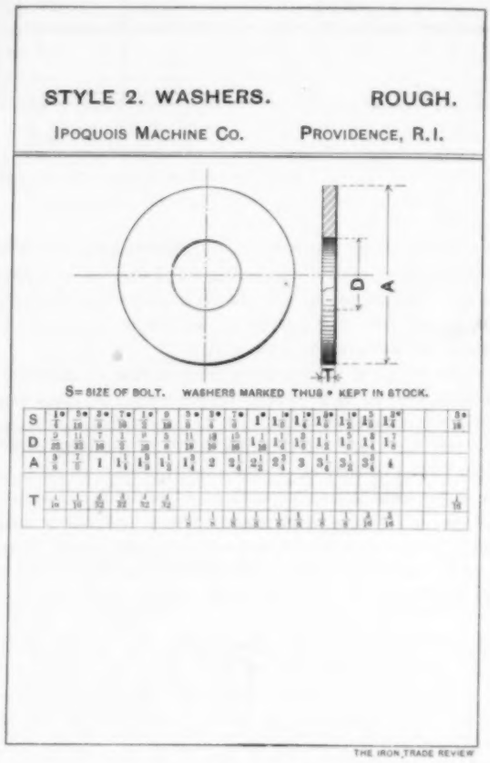

FIG. 7.

The three columns headed "Stock" are intended to fill in the various kinds, such as round, square, flat, etc., as required. In the next column is given the weight of all parts and in the last column headed "Remarks," any special material or data for all machines. The name of same is written in on the line directly under the title "List of Material for," opposite the name is printed the words "Order No." after which should be written the order number for building the machine. The order number, however, is only placed on this list wheen the list is made for a special machine, or mechanism, or in such cases in which the list will be used only once.

The bill of material forms one of the important parts of this system and consists of three printed sheets, size 9x12 inches, illustrated in Figs. 8, 9 and 10, which are made of ordinary white paper.

The order to produce a machine or a number of machines of the same type generally originates in the office of a concern. To use this system this order must go to the drawing room first. These lists are then filled out for the number of machines called for on the order.

Fig. 8 is the printed form for making out the bill of castings of an order to build one or more machines. The order number is placed opposite the words "Order No." in the upper left hand corner, the title of machine on the line under the words "Castings for," date and class No. in the upper right hand corner. Then this list is made out the same as the list of material Fig. 3, up to and including the column headed "Material." The next column headed "No. Pieces Wanted," must contain the number of pieces wanted for all the machines on the order. Next column headed "No. Pieces on Hand," is filled out by the stock room clerk. The difference between these two columns always shows if any new stock is to be ordered and the amount is filled in the next column headed "On Order." Column headed "Weight" contains total weights, next column price each, and next column contains total amount. The last column is for remarks on special data.

The sheets Figs. 9 and 10 are filled out in the same way as sheet Fig. 8, only they are made out for "Forgings and Stock," and "Bolts," "Screws," "Nuts" and "Washers." It is very evident that when these three lists, Figs. 8, 9 and 10, are filled out for a machine or a number of machines, and the material all supplied, the material cost of an order can be determined exactly. These lists also give an inventory of stock after the material for every order has been filled, a very desirable thing in every manufacturing or machine building concern.

For concerns continuously building the same kind of machines these lists can be printed complete up to the column headed "No Pieces Wanted." For my own work I have

IROQUOIS MACHINE COMPANY

Order No._____ CASTINGS FOR Date _____

Class No. _____

Class No.	Piece No.	No. Pieces One Mach.	Name	Material	No. Pieces Wanted	No. Pieces On Hand	On Order	Weight	Price	Amount	Remarks

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FIG. 8.—BILL OF MATERIALS. FORGINGS AND STOCK. ORIGINAL SHEET IS 9X12 INCHES.

used a mimeograph for making duplicates of these lists.

A drawing room system which does not furnish a complete record of all the difficulties, mistakes, and suggestions for improvement in every lot of machines built, is not complete and the Card Fig. 11 is for that purpose. These cards

IROQUOIS MACHINE COMPANY
FORGINGS AND STOCK FOR

Order No. _____ Date _____
Class No. _____

Class No.	Piece No.	No. Pieces One Machine	Name	Material	No. Pieces Wanted	No. Pieces On Hand	On Order	Cross Section: Square	Cross Section: Round	Length	Weight	Price		Amount		Remarks

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FIG 9.—BILL OF MATERIALS. FORGINGS AND STOCK. ORIGINAL SHEET IS 9 X 12 INCHES.

are made up in the form of a pad containing about fifty each, and one given to each foreman, and leading mechanics, salesmen, inspectors, etc. They are filled out as the form calls for, giving the class number, piece number and name of machine, date, etc. A rough sketch or written description of

IROQUOIS MACHINE COMPANY
BOLTS, SCREWS, NUTS AND WASHERS FOR

Order No. _____ Date _____
Class No. _____

Style No.	No. Pieces One Machine	Bolts & Screws: Diameter	Bolts & Screws: Length-B	Nuts: Size of Tap	Nuts: Case Harden or Soft	Washers: Size of Hole	Washers: Case Harden or Soft	No. Pieces Wanted	No. Pieces On Hand	On Order	Weight	Price		Amount		Remarks

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FIG. 10.—BILL OF MATERIALS. BOLTS, SCREWS, ETC. ORIGINAL SHEET IS 9 X 12 INCHES.

whatever is proposed is made on this card and sent to the drawing room to be filed in a card index system; and as soon as a new order comes to the drawing room the drawings are fixed up as these cards suggest.

The Midvale Steel Co.

On account of the action of Secretary Moody in awarding to the Midvale Steel Co. a part of the armor plate for new vessels, that company has come into greater prominence. The company was founded about 1860. Its business for some years was chiefly the production of steel billets by the open-hearth process and the forging of axes, tires, etc. When the elder Charles J. Harrah, now deceased, obtained absolute control of the works the company entered upon a new era of development. Eighteen years ago it began to make forgings for ordnance of various kinds. It has supplied the Watervliet Arsenal and the Navy Yard gun factory at Washington with millions of dollars' worth of forgings. In the Spanish-American war a very large percentage of the total number of cannon on the American ships was of Midvale manufacture, although they were put together and finished at the Government plants. The company at the present time is engaged upon contracts for ordnance for the United States Government. The plant at Nicetown, even as it stands, is one of the largest of any description in Philadelphia, and also one of the busiest. The Midvale contract calls for 6,639 tons of armor plate.

The Sloss-Sheffield Steel & Iron Co. has now seven blast furnaces in operation, two in Birmingham, two in North Birmingham, one at Florence and two at Sheffield. The company is having good fortune with its No. 2 furnace in Birmingham, which is producing 245 tons per day. Extensive repairs have recently been made on the stack.

ANNUAL MEETING OF THE A. S. M. E.

The opening session of the coming meeting of the American Society of Mechanical Engineers will be held at the society house, 12 W. 31st street, New York, Tuesday evening, Dec. 1. The president, James M. Dodge, will deliver the annual address, subject, "The Value of an Engineering Education to a Young Man." The second session will occur on Wednesday morning, at the hall of the Mendelssohn Glee Club, 113 West 40th street, because of the limited seating capacity of the society's auditorium. This will be the business session of the convention and professional papers will also be presented. The afternoon will be spent in making excursions to various power stations and points of interest. The evening of this day has been left free. The third session will take place in the Carnegie Laboratory of Stevens Institute on Thursday morning. The closing session will be in the society house on Friday morning, Dec. 4.

CLASS NUMBER _____ PIECE NUMBER _____
NAME OF MACHINE _____

19____ SIGNED _____
IROQUOIS MACHINE CO. WORKS: PROV. R. I.

INSTRUCTIONS:
This card is to be used for proposed improvements and alterations, suggestions as to methods of manufacture, necessary corrections in drawings and lists, and desirable jigs, fixtures or tools for rapid execution of work.

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FIG. 11.—INDEX CARD. ORIGINAL CARD IS 4 X 6 INCHES.

The nominations for officers of the society for the coming year have been made by the nominating committee as follows: For president—Ambrose Swasey, of Cleveland. For vice presidents—Prof. D. S. Jacobus, of Hoboken, N. J.; M. L. Holman, of St. Louis, and William J. Keep, of Detroit. For managers—George I. Rockwood, of Worcester, Mass; John W. Lieb, Jr., of New York, and Asa M. Mattice, of Pittsburg. For treasurer—William H. Wiley, of New York.

KELLER MILLING MACHINE FOR DIE CUTTING.

The Keller inverted milling machine has been the subject of recent patents by J. F. Keller, of New York, and is specially designed for die cutting. Fig. 1 illustrates the machine and Fig. 2 shows the milling machine with the overhead vertical attachment. The Keller die cutter weighs about 800 pounds. The roughing out of blanking, piercing and other dies is done

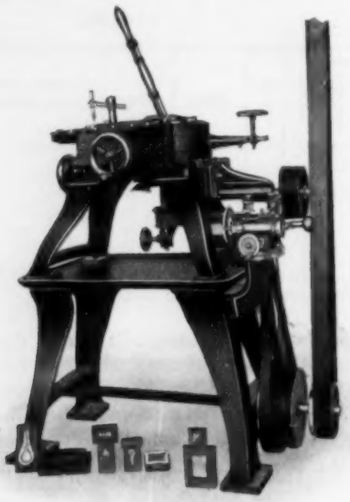

FIG. 1.—THE KELLER DIE CUTTER.

with the aid of two substantial slides and screws, as on milling machines generally, these screw feeds being operated by hand wheels. Then the screw feeds are released and a hand lever enables the workman to cut to the most delicate and intricate outline. The great usefulness of the machine lies principally in the universal movement by which the finishing is done. On account of the high speed at which the finishing cutter runs a very fine pointed tool can be used and thereby very close work obtained. The cutter may be ground right on the milling machine and maintained in excellent order for the exacting purposes employed. The machine is intended to run at a slow speed, 250 r. p. m. for roughing, and at 2,200 to

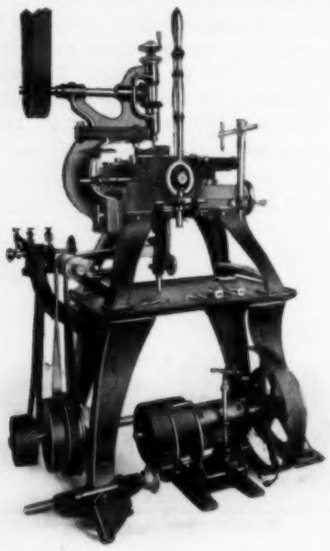

FIG. 2—DIE CUTTER WITH OVERHEAD VERTICAL ATTACHMENT.

3,000 r. p. m. for finishing. At the slow speed the power is transmitted to the cutter through the upper shaft by means of bevel gears and for high speeds the gears are disengaged by pulling out the shaft, after releasing a collar. In the latter case the power is transmitted from a two-step cone on the lower shaft. The work chuck will take a die 10 by 20 inches and may be swung out of position to give easy access to the spindle without removing the work.

The vertical milling attachment, Fig. 2, is especially useful in roughing out hubs, dies and punches. This device is attached to the side of the machine in place of the fixture, with the upper shaft giving the slow speed. The upper part can be swung out to replace the tool without the necessity of removing work from chuck. The profiling attachment consists of a two-jaw adjustable chuck to hold the template and two follower arms for pointer or guide. The latter is also serviceable for following a line when the point of the cutting tool is hidden from view. The grinder is especially designed for tapered tools. It is provided with a 4-inch wheel and is driven from the two-step driving cone.

The machine is built by the Keller Mechanical Engraving Co., of West Broadway, New York.

STRONG SAND FROM BLAST FURNACE SLAG.

The Shinn Slag Sand Co., of Pittsburg, has installed its slag granulating device, patented by Joseph A. Shinn, at the Soho furnace of the Jones & Laughlin Steel Co., Pittsburg, and at the furnace of the Youngstown Steel Co., Youngstown, O. Both these furnaces have had slag granulating pits and the slag was granulated in the ordinary way until the installation of the Shinn method, by which the strength of the granulated slag is greatly increased and the weight bushel for bushel is also increased. Two sprays, each under 60 pounds pressure, are used. One horizontal spray strikes the slag just as it leaves the runner spout and the velocity of the water is sufficient to carry out the slag into a thin sheet. As the slag is thus carried out it is struck from above by another spray at such an angle that it is granulated in a more desirable form than by dropping the slag into a pit partly filled with water. In Pittsburg this slag sand is selling in competition with river sand at the same price, and as it shows a greater strength, is preferred for most purposes.

Slag sand as granulated in ordinary pits is now extensively used in lime mortar for plastering and for laying brick and stone work; also in cement concrete for the heaviest building and machinery foundations, arches, etc. Ordinary granulated slag weighs 41 pounds to the U. S. bushel and has a tensile strength as soft mortar at 28 days of 50 pounds, and as stiff mortar of 70 pounds. Shinn's slag sand weighs 66 pounds to the U. S. bushel, and has a tensile strength in soft mortar of 131 pounds at 28 days and in stiff mortar of 160 pounds.

Comparative tests of mortars made from Allegheny river sand and Shinn's slag sand with various cements and lime, made by the Pittsburg Testing Laboratory, Ltd., all the mortars containing three parts of sand to one part of cementing material, were as follows:

Cements	Sands	Tensile Strength Lbs. per Sq. In.			
		7 days	14 days	28 days	3 Months
Portland	River	252	324	390	435
	Slag	278	375	484	594
Comparative	gain, lbs.	26	51	94	159
Comparative	gain, per cent.	10.3	15.8	24	36.5
Louisville	River	44	47	50	120
	Slag	59	61	63	145
Comparative	gain, lbs	15	14	13	25
Comparative	gain, per cent.	34	30	26	21
{Puzzuolana	River	153	192	222	332
{Slag Cement	Slag	174	271	295	479
Comparative	gain, lbs	21	79	73	147
Comparative	gain, per cent.	15.7	41	32.5	44.3
Mason's Mortar:	soft				
Lime	River	0	0	17	24
	Slag		90	131	163
Comparative	gain, lbs.			114	139
Comparative	gain, per cent.			771	580
Concrete Mortar:	stiff				
Lime	River			34	47
	Slag		142	160	255
Comparative	gain, lbs.			126	208
Comparative	gain, per cent.			371	441

The National Cellular Steel Co., of New York, recently incorporated, has elected the following officers: J. Vechten Olcott, president; James N. Rude, vice president; J. P. Fleming, secretary and treasurer; H. Neil Wilson, Martin M. Durrett, and Sidney G. Stricker, directors. It will manufacture cellular steel to be used for the construction of buildings, which is to take the place of tiling now used in laying floors.

THE LITTLE GIANT STOKER.

The Little Giant Stoker, manufactured by the Chicago Pneumatic Tool Co., of Chicago, is illustrated in the three halftones herewith. Fig. 1 shows the interior arrangement of the mechanism in section. Fig. 2 presents a view of a typical installation and Fig. 3 shows the readiness with which the flues may be reached for cleaning, by taking down the hoppers and removing the driving chains. These parts are light and are quickly removed or handled by one man.

The coal in passing through the sleeve of the hopper travels over a rotating wheel which regulates the flow as desired. From this point the fuel passes into a slowly moving spreader or oscillating chute and is forced along by the aid of a superheated steam jet. The spreader, as it moves backward and forward, evenly distributes the coal in a thin stream over the grate, reaching the remote corners in fact, and thus the entire grate is covered with as intense a fire as the more conveniently accessible center of the grate surface. The stoker can be adjusted to any type of boiler.

It will be seen that if for any reason hand firing is desired, this may be done without removing or making any alteration in the attachments. All rotating or oscillating parts are slow moving and have but slight strain or wear. Every part is provided with ample means for lubrication or is of ball-bearing type. There is no part sufficiently far out over the fire to burn out except the spreader and this is made to be

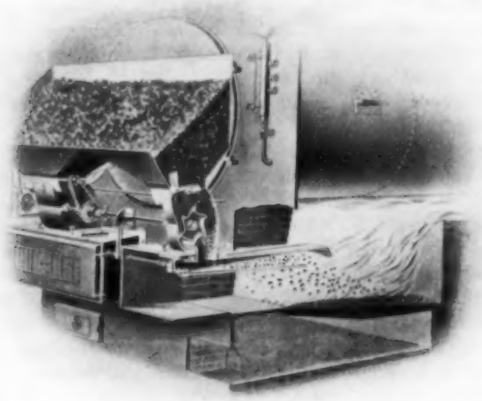

FIG. 1.—DETAILS OF LITTLE GIANT STOKER.

taken off at will. The manufacturers assert that they have never renewed the spreaders on any of the stokers which have been in constant use for over six months. Every part is numbered and is interchangeable.

The National Valve Co., Sandusky, O., recently incorporated, was organized for the purpose of purchasing the plant of the old Vincent Valve Co., which was recently sold at receiver's sale. The plant was purchased by John G. Schurtz, who was the largest creditor of the old concern, and turned in to the new corporation. The National Valve Co.'s property was mortgaged for $40,000, $20,000 being used to take up a first mortgage upon the Vincent Valve Co.'s property, and the other $20,000 to be used in making betterments, extensions, improvements, etc., and for working capital. The business of the new company commenced Nov. 2. John G. Schurtz was elected president and has resigned his position as cashier of the State Bank of White Pigeon, Mich., and gone to Sandusky to take the active management of the business. H. W. Collins, of Detroit, Mich., who has for many years been employed by the Michigan Brass & Foundry Co., has resigned from his service with that company and will be superintendent of the plant. It is the plan to manufacture fire hydrants, plugs, etc., in connection with valves. The directors of the company are Randall E. Schuck, Frederick P. Zollinger, James Flynn, Henry J. Beilstean, John D. Schurtz, John G. Schurtz and W. E. Guerin, Jr. The officers of the company are John G. Schurtz, president; Henry J. Beilstein, vice president; John G. Schurtz, treasurer; and W. E. Guerin, Jr., secretary. All of the directors except John D. Schurtz are residents of Sandusky.

REMINISCENCES OF HOLLEY.

Dwight Goddard, in the recent issue of the short story series of Wyman & Gordon, drop forging manufacturers, of Worcester, Mass., has brought together some very interesting facts concerning a genial and gifted engineer, the late Alexander Lyman Holley. A few extracts from the account are appended:

"His graduating oration at Brown was on 'The Natural Motors,' and he entered at once the employ of Corliss & Nightingale for the production of a locomotive. He worked as draftsman, machinist, and subsequently ran this trial locomotive until it proved to be unfit. In later years, in one of his felicitous after-dinner orations before the A. S. M. E., he referred to this locomotive as being a cross between Mephistopheles and a Colorado mule, having an inborn cussedness. Strange to say, she showed excellent indicator cards, and he went on to say: 'Well, once in a while, when she had been jackassing over the road about four hours behind time, and we had

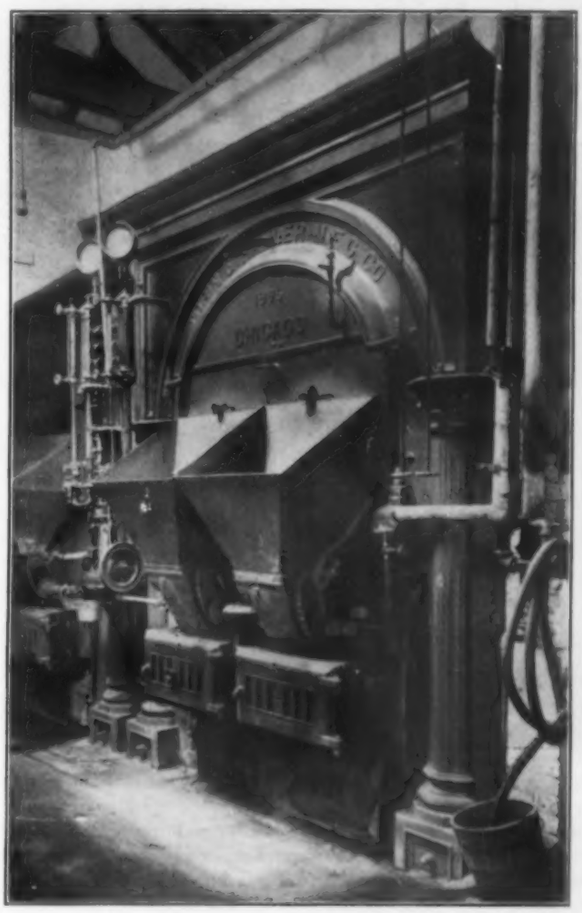

FIG. 2.—A TYPICAL APPLICATION OF THE LITTLE GIANT STOKER.

pinch-barred her into the round-house, we used to pull out these indicative cards and talk them over right before her, and we would look at her and ask one another why in thunder an engine that could make a card like that would act as if the very old-chief engineer was in her. And next morning she would rouse up and pull the biggest train that ever had been over the road ahead of time?'

"He was sent to England in 1863 to investigate the Bessemer process for making steel. It had been tried in an experimental way by Cooper & Hewett, but with them, as in England, the difficulties encountered had proven to be a serious setback to its introduction. Alexander Holley's keen observation recognized the inherent value of the process, and he secured for his clients the sole American license.

"He returned, was admitted to the firm of Griswold, Winslow & Holley, and began in 1865 the construction of a Bessemer steel plant at Troy, N. Y. From this time on his energies were largely given up to the engineering problems of this

process. In 1867 he designed and built the works at Harrisburg, Pa. Then in 1868 he rebuilt the works at Troy.

"In the years that followed he designed the works at North Chicago, Joliet, and the Edgar Thomson works at Pittsburg. The latter he valued as his most conspicuous success.

"Mr. Robert W. Hunt, in speaking of Holley's pre-eminent service in enormously increasing the production and cheapening the cost by the high excellence of his general plans, credits him with the following particular improvements: Raised furnaces and converters, top supporters, hydraulic cranes, use of three ingot cranes, location of converter in relation to pit and furnaces, improved ladle crane, a single operating point for all cranes, ladles and converter, use of cupolas instead of reverberatory furnaces, an intermediate, accumulating ladle placed on scales, an improved ladle bottom.

"Unconsciously he pictured his own end one night at Pittsburg, when he had been called from a sick-bed to respond to a gift of plate from his associates. What could be more beautiful and pathetic than his closing words on that occasion:

"'Among us all who are working hard in our noble profession and are keeping the fires of metallurgy aglow, such occasions as this should also kindle a flame of goodfellowship and affection which will burn to the end. Burn to the end!—perhaps some of us should think of that, who are "burning the candle at both ends." Ah! well, may it so happen to us

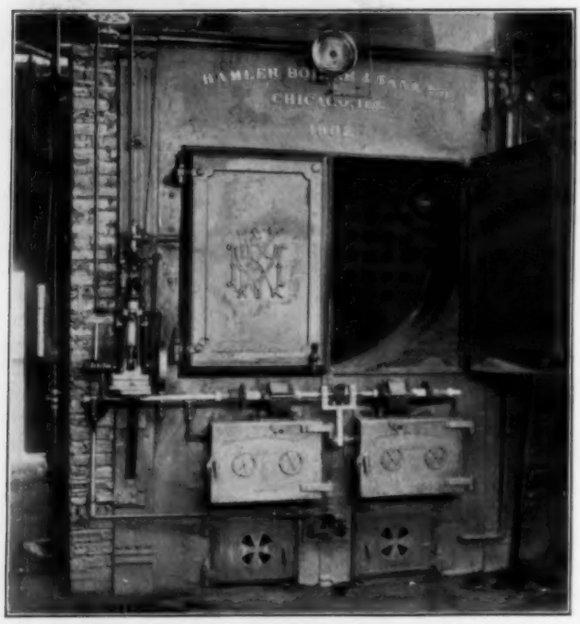

FIG 3.—HOPPERS REMOVED FOR FLUE CLEANING.

that when at last this vital spark is oxidized, when this combustible has put on incombustion, when this living fire flutters thin and pale at the lips, some kindly hand may "turn us down," not "under-blown"—by all means not "over-blown"—some loving hand may turn us down, that we may, perhaps, be cast in a better mold.'"

The Crucible Steel Co. of America has decided to discontinue the publication of its bi-monthly journal, *Sparks from the Anvil*, and in accordance with its general policy of retrenchment will also abandon its publication department. Albert L. Butler, the editor and manager of this department, will retire from the service of the company Nov. 15. Mr. Butler organized the company's export and publication departments and, besides being a salesman, is the author of its catalogues and advertisements. He has also compiled several works on the treatment of steel, a subject with which he is familiar. His address, until Feb. 1, will be Hammonton, N. J.

The Shelby Iron Co. has decreased its dividend for the last half of the year 1 percent. The company owns two furnaces at Shelby, Ala., and has $1,000,000 capital. In 1901 it paid 11 percent, in 1902 16 percent, and will pay 15 percent

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The C. W. Van Blarcom Co., New York City, has been incorporated with a capital of $100,000 to manufacture machiney. The directors are: Joseph Whitefield and E. W. blarcom, of New York, and Herbert Van Blarcom, of Paterson, N. J.

The Bryant Steel Wheel Co., capital stock $200,000, has been incorporated by C. M. Henley, 75 North Ohio Ave., and and other citizens of Columbus, O., to manufacture steel wheels. The company has been offered a site by the Board of Trade of Washington C. H. It has not decided whether it will accept.

The American Air Tool Co., Dunkirk, N. Y., capital $300,000, has been incorporated. The directors are: John Gorton, of Schenectady; F. W. Smith, C. J. Carney, I. M. Murray, James McNaughton, N. F. Gould and J. C. Hurlbert, all of Dunkirk.

The Mathis Bros. Co., Hammond Ind., has been incorporated with a capital of $130,000, for the manufacture of ventilating apparatus and electrical machinery.

A stock company, with a capital of $50,000, has been organized at Lexington, Va., to manufacture a new automatic airbrake for railroad trains, invented by J. P. Birmingham, of Lexington. The officers are: W. G. Matthews, of Glasgow, Rockbridge County, Va., president; Col. Robert Catlett, Lexington, secretary; J. P. Birmingham, Lexington; W. H. Partlow, Staunton; E. J. McCullough, Lexington; and J. P. Halsey, Lynchburg, directors.

The Rowley Scale & Supply Co., capital $10,000, has been organized at Detroit.

The Bullard Automatic Wrench Co., Los Angeles, Cal., has been incorporated with a capital of $100,000. The directors are: F. D. Bullard, J. R. Haynes, West Hughes, H. Bert Ellis, and T. F. Miller, of Los Angeles.

The Acton Valley Forge & Casting Co., New York, capital $25,000, has been incorporated to manufacture iron and steel tools.

The Atlantic Stove & Mfg. Co., Boston, has been incorporated with a capital of $350,000. The incorporators are: Chas. A. Boynton, president; Jay B. Cramford, treasurer, and Henry E. Ruggles, clerk.

The Conrad Iron Works, of Mt. Pleasant, Mich., wants to buy a 100-pound power hammer.

The Reliance Iron & Engine Co., Racine, Wis., has been incorporated with a capital of $15,000. The incorporators are: John P. Davies, T. W. Thiesen, J. C. Hansen, George W. Gates, W. V. Johnson, and Charles Felgenbauer.

The American Casting Co., Birmingham, Ala., capital $20,000, has been incorporated. The incorporators are: Julien Dow, George H. Harris, Daniel Dimmick and Harry V. Dimmick.

New Construction:—

James H. Paine & Son, engine builders, Noank, Conn., are building a shop 50x62 feet, one story, which will give the firm largely increased facilities.

The Nazareth Foundry & Machine Co., Nazareth, Pa., is building an addition 28x78 feet, three stories, for office and pattern and machine work.

Henry C. Bradley, manufacturer of wood working machinery, Bridgeport, Conn., is erecting a building, 36x76 feet, two stories. A part of the machinery has not been purchased.

The Moore Drop Forge Co., Springfield, Mass., will occupy its new plant at Brightwood this month. It consists of a drop forging shop, 50x74 feet, press room, 20x40 feet, and a machine shop, 45x64 feet. The company recently increased its capital stock from $20,000 to $40,000.

The Crawford & McCrimmon Co., Brazil, Ind., will erect a two-story building, 40x150 feet, for offices and drafting rooms, and will probably build a foundry next year.

The plant of the Vilter Mfg. Co., Milwaukee, Wis., is being greatly improved. The pipe shop will be made 20 feet wider and 200 feet long. There will be an addition 80x85 feet, in

which will be placed a 12-inch pipe cutting machine and a 2-inch pipe cutting machine, in addition to the machines which will be transferred from the old shop. A new blacksmith shop, 20x80 feet, will also be erected.

The Emporia Mfg. Co., Belfield, Va., has just completed its building and all of the machinery has been bought. It will be ready to start in about a week or two. The company will operate a first-class machine shop.

The addition to the foundry of the Hildreth Motor & Pump Co., Lansing, Mich., will soon be completed. The company has had a prosperous year, and has recently increased its capital stock from $20,000 to $30,000.

The Laclede Gaslight Co., St. Louis, Mo., will build a one-story steel and iron-clad machine shop at a cost of $4,000.

The large machine shop being erected at the Washoe Smelter, Anaconda, Mont., is nearly completed. The frame work is entirely of steel. One part of the building will be devoted to the machine department, while another will be used by the boilermakers.

The new plant which the Marinette Iron Works will erect at Chicago Heights will be of steel, stone and mill construction. It will include two machine shops, 80x350 and 70x200 feet, respectively; foundry, 80x250 feet; blacksmith shop, 80x50 feet; boiler and engine house, 50x75 feet; and a two-story pattern shop, 50x100 feet.

A. A. Suber, proprietor of the Deshler Foundry & Machine Works, Deshler, Ohio, is building a large addition to his plant. Considerable new machinery will be installed.

The Ward-Dickey Co., Hammond, Ind., will erect a plant to manufacture planished sheet steel. Work of grading will soon be begun.

The Erickson & Wyman Co., Seattle, Wash., will erect a corrugated iron foundry building at a cost of $1,500.

Fisher & Aney will erect a machine shop 42x70 feet at Underwood, Ia., to take the place of the plant destroyed by fire some time ago.

The Northwestern Barb Wire Co., Sterling, Ill., whose capital was recently increased from $100,000 to $175,000, advises us that it has not decided on its new construction on account of not having enough space on which to build. The company needs the buildings badly and may be compelled to change its location to some point where it can have more room. Its trade is excellent and growing.

The Joseph Reid Gas Engine Co. has just completed its plant at Marietta, Ohio. The building is 48x160 feet, and about 20 men will be employed.

The California Iron Works Co., Eureka, Cal., has begun the erection of a building 60 feet by 110 feet, to be used as a machine shop and foundry.

The Reliance Iron & Engine Co., Racine, Wis., will build a plant for the making of gray iron specialties and engines. About 40 men will be employed.

The Gillmore-Rollins Iron Works Co., Minneapolis, Minn., has let the contract for a warehouse, which will be four stories, 50x150 feet, and will cost $45,000.

The Lorraine Foundry Co., Baltimore, will erect a building 60x100 feet, to be used as a machine shop.

The plant of the International Steam Pump Works, now in course of erection at Newark, N. J., will include a machine shop, 1,006 long by 123 feet wide. The main foundry will be 600x141 feet. The other buildings are a high erecting shop, 150x124 feet; erecting shop, one story, 60x123 feet; pattern shop, four stories; power house, 174x118 feet; machine molding shop, 400x68 feet, and a cleaning room, 200x60 feet. The works will give employment to about 3,000 men.

Fires and Accidents:—

Fire almost completely destroyed the plant of the Champion Drill Works, at Avon, N. Y., a few days ago. Loss about $20,000.

Fire at the plant of the Glauber Brass Mfg. Co., Cleveland, last week, caused a loss of $15,000.

The plant of the Johnson Forge Co., Wilmington, Del., was destroyed by fire Oct. 29. Loss is about $125,000, partly covered by insurance.

The foundry of Wessling Bros., Sherman and McLean Aves., Cincinnati, was damaged by fire Oct. 30, causing loss of $1,500.

Fire in the plant of the Dominion Motor & Machine Co., Toronto, caused a loss of about $10,000.

The Pittsburg and Valley Districts:

J. D. Lyon & Co., Pittsburg, with offices in the Farmers Bank Bldg., have been appointed Pittsburg district representatives of the Phœnix Iron Works, of Meadville, Pa. During the past week they secured an order for two 400-h. p. direct connected steam engines, made by this company, from the International Coal & Coke Co., whose plant will be located at Alberta, B. C.

The new plant of the Sligo Iron & Steel Co., Connellsville, Pa., is now in partial operation. At this plant the famous brands of soft steel and puddled iron, which have been on the market for nearly a century, and manufactured by Phillips, Nimick & Co., will be made. The brands include Sligo stay-bolt iron, Tyrone bar iron, Sligo bar iron, and Crown iron. When the plant is in full operation iron and steel plates, sheets, angles, tees and light rails will be manufactured and a large stock will always be carried in the company's warehouse on West Carnon St., Pittsburg, Pa., where the company's main offices are also located.

The Epping-Carpenter Co., Pittsburg, has purchased from the American Bridge Co. the old plant of the Pittsburg Bridge Co., which adjoins the former's works. The site consists of five acres and will be used for extensions to the Epping-Carpenter plant. This company manufactures all kinds of pumping machinery. The American Bridge Co. has no further use for the Pittsburg Bridge plant, as the Ambridge works are nearing completion and all of the company's plants in the Pittsburg district will be centralized there.

The Cherry Valley Iron Co., Pittsburg, will immediately proceed with the erection of an additional stack at West Middlesex, Pa., where it now operates the Fannie stack. An order for two pairs of Wheeler water tube boilers for this furnace plant was recently placed with the Sharon Boiler Co., of Sharon, Pa.

The Pittsburg plant of the American Tin Plate Co., New Kensington, Pa., was shut down last week for an indefinite period. The plant contains eight mills.

The Penn Bridge Co., Beaver Falls, Pa., has recently received contracts for the erection of three bridges which will require approximately 2,000 tons of structural material.

It is reliably reported that the Wabash Railroad will secure an entrance into Youngstown, O., property to the value of half a million dollars having been secured for a right of way.

Rapid progress is being made on the erection of the plant of the Kidd Brothers & Burgher Steel Wire Co., at Aliquippa, Pa., and it is probable that the plant will be placed in operation in December. The main building will be 60x240 feet. This concern manufactures drill rods, polished needle wire and back steel rods.

On Monday, Nov. 2, the Rosedale Fdy. Co. and the Specialty Mfg. Co., of Allegheny, Pa., were consolidated under the firm name of the Rosedale Foundry & Machine Co. The business of the former companies as engineers, founders and machinists will be continued by the Rosedale Foundry & Machine Co., as will also the manufacture of the Playford improved chain grate stoker. A large new foundry and machine shop was recently completed in Allegheny by the Rosedale Foundry Co. and the concern is equipped with the most modern machinery obtainable.

The addition to the plant of the Westinghouse Electric & Mfg. Co., East Pittsburg, Pa., is rapidly nearing completion, nearly all of the machinery already being in place. This addition, which is of steel and brick construction, is 200 feet wide and 1,360 feet long and will be devoted exclusively to the manufacture of electric motors.

The Hyde Park Foundry & Machine Co., Hyde Park, Pa., has increased its capital stock to $60,000. No improvements are contemplated at this time.

The new plant of the American Structural Steel Co. of Pittsburg, at Carnegie, Pa., was placed in operation this week. The main building is 250x100 feet, with an 18x20-ft. L. The monthly output of the plant will be about 1,200 tons. The main office of the company is in the Times Bldg., Pittsburg.

The company is capitalized at $200,000 and has the following officers: C. A. Balph, president; J. T. Joyce, vice president; and H. B. Shidle, secretary and treasurer.

The Latrobe Wheel & Mine Supply Co., Latrobe, Pa., recently incorporated, has purchased the old mower and reaper plant at that place and will erect a wheel foundry and machine shop.

The United States Coal & Coke Co., which is in control of the West Virginia coking operations of the United States Steel Corporation, is preparing to build 1,100 additional ovens in the Pocahontas field in West Virginia, where 1,000 are already in operation.

At the meeting of the stockholders of the Pittsburg Valve & Fittings Co., held in the offices of the company in the Frick Bldg., Pittsburg, last week, it was decided to increase the capital from $300,000 to $500,000. The increased capital is to be used for the purpose of adding a malleable foundry and to increase the equipment of the iron and brass departments. The iron fitting department located at Barberton, O., has an output of 15 tons daily. The brass fittings department will be placed in operation about the first of the year.

The foundries operating in connection with the Braddock plant of the Carnegie Steel Co., Braddock, Pa., which were shut down last week, resumed operations in full this week.

Announcement has been made that the tinning department of the Shenango plant of the American Tin Plate Co., New Castle, Pa., would be placed in operation on the same day as the hot and cold rolling departments, namely, Monday, Nov. 9.

The output of the blooming mill of the LaBelle Iron Works, Steubenville, O., is constantly increasing. One night turn recently turned out 1,011 slabs, each weighing 715 pounds, making one slab every 36 seconds. The best previous record during one turn was 780 slabs.

The entire plant of the American Tin Plate Co., South Sharon, Pa., is now on in full, the remaining five idle mills of the twenty in the plant having been placed in operation this week.

The Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., suspended operations this week for an indefinite period on account of the depression in the iron and steel trade. Furnaces Nos. 1 and 3 of the Ohio works of the Carnegie Steel Co., Youngstown, O., were again banked this week, although the Bessemer department of this plant continues in operation. No. 2 stack of this plant, which was to have been blown in this week, will not be relighted for some time. While the furnaces are banked the direct hot metal process will be dispensed with, as sufficient pig metal is piled in the yard of the plant, and this, together with metal that will be shipped from other corporation furnaces, will be sufficient to keep the steel plant in operation.

The Pennsylvania Malleable Co., McKees Rocks, Pa., is now making steel discs for the Schoen Steel Wheel Co., one of the malleable furnaces in the plant having been converted into a steel furnace. The furnace has an output of about 20 tons daily.

The report that the plant of the LaBelle Iron Works, Steubenville, O., would be shut down for an indefinite period is officially denied.

The Pope Tin Plate Co., Steubenville, O., this week placed seven of its twelve mills in operation. It is not known when the remaining five mills will be placed in operation.

The Pittsburg Steel Construction Co., Pittsburg, Pa., has purchased a site of ten acres for the erection of a new structural fitting shop near Ambridge, Pa. The material for the new plant is now being fitted at the plant in Allegheny, Pa., and upon the completion of the new plant the Allegheny plant will be dismantled.

Edward Schenk, formerly connected with Tate, Jones & Co., Inc., Pittsburg, Pa., has opened an office in the House Bldg. and will engage in the sale of coal and ash handling equipment for power plants. He now represents the Iron Engine Co., Ironton, O., and the Wagner Palmros Mfg. Co., Fairmount, W. Va.

General Industrial Notes:—

The East St. Louis Locomotive & Machine Shop Co., East St. Louis, Ill., has purchased a machine shop to be used for repairing locomotives. The shop is 100 feet wide and 200 feet long and six locomotives can be repaired at one time.

The Empire Folding Machine Co., Palmyra, N. Y., recently incorporated, has acquired the business of the Peerless Folding Machine Co., has rented shops and is moving into them. No new tools are required.

The American Air Tool Co., recently incorporated with a capital of $300,000 to manufacture pneumatic tools, will occupy the works of the defunct Hartford Axle Co., at Dunkirk, N. Y.

The directors of the Juniata Steel & Iron Co. announce that the mills at Greencastle, Ind., will probably resume January 1. It is stated that the money necessary to put the mills in operation has been provided.

The Pennsylvania Steel Co. has begun the manufacture of a new pattern of steel rail which weighs 140 pounds to the yard, and is for the Pennsylvania railroad. The order calls for 3,400 tons, but may be increased to 8,000 tons.

The brass foundry of the Pennsylvania Railroad Co., Altoona, Pa., employing 2,500 men has been obliged to close down on account of lack of orders.

The Finlay-Otten Foundry Co., Buffalo, N. Y., recently incorporated with a capital of $50,000, was referred to last week. This company succeeds the Finlay-Graves Foundry Co., assuming all indebtedness and taking over all contracts. The location is changed from 29 Mississippi St. to 25 Washington St. Clarence J. Cochrane is manager.

The property of the Ohio Steel & Iron Specialty Co., Cuyahoga Falls, O., will be again offered for sale Nov. 12. There will be no sale unless bids amount to at least $2,500.

The Ball Engine Co., of Erie, Pa., will install three 450-h. p. engines direct connected to generators, for the Milwaukee Coal & Coke Co., Milwaukee, Wis. These engines are to be used for by-product coke ovens.

The recent increase of capital of the Kingman Plow Co., Peoria, Ill., was subscribed to provide for the growth of the business. The company has a new and up-to-date plant.

Bridgeford & Co., Louisville, Ky., manufacturers of stoves, while put to some inconvenience by the recent fire which destroyed one of their warehouses and the stock, have kept the plant going constantly and all orders are being filled.

The Hill & Griffith Co., Cincinnati, is moving its machinery from its old plant to the six-story brick building, cor. Gest street and C. H. & D. railroad. A part of this building has heretofore been occupied by the company as a ware room and office, the machinery having been in another building about a square away.

The Crescent Foundry, Pueblo, Colo., has commenced operation under the management of E. J. Moulds.

A. L. Pitts and James W. Thompson, Dubuque, Ia., have purchased the business of Headford Bros. & Hitchins, and will continue it under the name of the Pitts-Thompson Foundry Co., which will make gray castings and deal in architectural iron work. The company will also manufacture fire escapes and iron stairways.

The new foundry recently built by the Union Steam Pump Co., Battle Creek, Mich., will be in operation about Dec. 1.

Employes of the Cohoes Tube Works, Cohoes, N. Y., have been notified that the plant will be closed down for an indefinite period. The plant employs about 200 men.

The directors of the Ft. Wayne Iron & Steel Co., Ft. Wayne, Ind., announce that they expect to start the muck mill of their plant between the 15th and the 20th of November. This department will be run about a week before the finishing mills are started.

The name of the Duluth Dredge & Dock Co., Duluth, Minn., has been changed to the Marine Iron Co., which concern has filed articles of incorporation with a capital of $50,000. The company will repair marine, stationary and gasoline engines, and may build a foundry in the spring.

A certificate of merger has been filed with the secretary of state of New York, showing the coalition of the Finlay-O'Hen Foundry Co., of Buffalo, and the Finlay-Graves Foundry Co., of New York, under the name of the former.

Spieler & Winter Mfg. Co., Syracuse, N. Y., recently incorporated, have obtained part of the buildings formerly occupied by the Phœnix Foundry, and have installed a new plant for the manufacture of die cast castings of special bronze.